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BRITISH COLUMBIA PROVINCIAL MUSEUM
DEPARTMENT OF EDUCATION

HANDBOOK No. 16

The ORCHIDS of British Columbia

By

Adam F. Szczawinski

Illustrations by Frank L. Beebe

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METRIC UNITS

10 millimetres (mm.)	= 1 centimetre (cm.)
10 centimetres	= 1 decimetre (dm.)
10 decimetres	= 1 metre (m.)
1,000 metres	= 1 kilometre (km.)

METRIC AND ENGLISH CONVERSION TABLE

Linear Measure

1 kilometre	=	0.6214 mile
1 metre	=	39.37 inches 3.2808 feet 1.0936 yards
1 centimetre	=	0.3937 inch
1 millimetre	=	0.03937 inch
1 mile	=	1.609 kilometres
1 yard	=	0.9144 metre
1 foot	=	0.3048 metre
1 foot	=	304.8 millimetres
1 inch	=	2.54 centimetres
1 inch	=	25.4 millimetres

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By Adam F. Szczawinski
Illustrations by Frank L. Beebe

1959

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1959

BRITISH COLUMBIA
DISTRIBUTION MAP
BRITISH COLUMBIA PROVINCIAL MUSEUM
Scale of Miles
0 50 100 200
132°
128°
124°
120°
116°
60°
56°
52°
58°
54°
50°
130°
126°
122°
118°
114°
ATLIN
TELEGRAPH CREEK
ALASKA
Cassiar District
Rocky Mountains
Peace River District
PRINCE RUPERT
QUEEN CHARLOTTE ISLANDS
HECATE STRAIT
QUEEN CHARLOTTE SOUND
PACIFIC OCEAN
PRINCE GEORGE
Cariboo District
KAMLOOPS
Kootenay District
VANCOUVER
NANAIMO
VANCOUVER ISLAND
VICTORIA
Okanagan District

PREFACE

No general treatment of our native orchids has appeared since the publication of the *Flora of Southern British Columbia and Vancouver Island*, by J. K. Henry, in 1915, and its supplement, by J. W. Eastham, in 1947. Since then, many collections have added new records of species for British Columbia, and in addition a number of corrections and some important taxonomic changes have been made in the interval.

The chief purpose of this handbook is to bring together for the first time all these available data concerning our orchids to serve those who are interested in this fascinating group of plants.

This work is naturally, in a large part, based upon literature as the descriptions of all our species are available in a number of excellent works. These were referred to frequently and in particular: Correll's *Native Orchids of North America*, 1950; Morris and Eames, *Our Wild Orchids*, 1929; Abrams, *Illustrated Flora of the Pacific States*, Vol. 1, 1923; Gleason, *The New Britton and Brown Illustrated Flora*, Vol. 1, 1952; Henry's *Flora of Southern British Columbia and Vancouver Island*, 1915; and Peck's *Manual of the Higher Plants of Oregon*, 1941.

To all of these and to numerous other publications, the author is indebted for much of the data used.

The author also wishes to express his indebtedness and thanks to all those persons who have in any way helped him during the course of this work. Without the assistance and co-operation of many individuals and the use of various herbaria, the completion of this handbook would have been impossible.

Mention should be made and thanks extended to Frank L. Beebe, artist and illustrator of the Provincial Museum, for skilful work in preparing the drawings.

Sincere thanks are extended to: J. A. Calder, Science Service, Ottawa, for supplying many data concerning distribution of native orchids; Dr. T. M. C. Taylor, University of British Columbia, and Dr. L. Hitchcock of the University of Washington for courtesies and help; and W. A. Newcombe, of Victoria, for the privilege of using his private collection.

The author is also indebted to Dr. G. C. Carl for advice, generous support, and interest shown in checking the manuscript.

He also acknowledges his obligation to Mrs. S. Newnham for preparation of the distribution maps and for typing the manuscript, and Mrs. E. Skinner for her interest and advice.

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A. F. S.

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The Orchids of British Columbia

INTRODUCTION

Orchids are predominantly inhabitants of the tropics, and most of the orchids sold by florists or used for decoration are artificially raised varieties or hybrids of these tropical plants, but there are many sorts which occur naturally in temperate regions. Less splendid than those from warmer climes, they nevertheless often rival them in charm and beauty, and so they are considered aristocrats among the flowers. Many people, when they speak of orchids, think only of these exotic tropical varieties, neglecting our own native species.

Our wild orchids are often thought to be so rare that there is little chance of their being seen by ordinary hikers or visitors to the Province. This is certainly true of some species, but there are many others which are often found, sometimes in large numbers. You may find them in woods, open moorlands, deep ravines, or even in gravel outwashes and talus slopes. Naturally, you will not find the same kinds in all these places. Each one has its own special set of conditions, its habitat.

The orchid family (Orchidaceæ) is a cosmopolitan one, attaining its highest development in the tropics and subtropics of both hemispheres; it is one of the largest families of flowering plants in the world, consisting of about 450 genera with 15,000 or more species and varieties. Only one family is larger, the Compositæ, with 950 genera and probably 20,000 or more species. Eleven genera of orchids are credited to British Columbia. The genera represented by the largest number of species are *Habenaria, Listera,* and *Corallorhiza.*

The orchid family is unusual among the higher plants for a good many reasons, such as extreme variation, highly specialized flowers, and great range of habitat. It is interesting that the number of seeds produced in a single capsule is, in many cases, phenomenal. A count made at the Greenwich Observatory, England, showed

that a capsule of the tropical American orchid *Cycnoches chlorochilon* contained 3,770,000 microscopic seeds. The number of seeds varies with each species, but, speaking generally, one might say that the seed production in orchids is enormous.

The seeds are interesting, for, unlike the seeds of most plants, orchid seeds have no food reserve stored up to give the embryonic orchid a start in life, and so they depend entirely upon external aids such as fungi to assist in germination and growth of young seedlings. Unless the conditions of temperature, moisture, soil, and shelter are ideal, failure for the seedlings is certain. There is one chance in thousands that such ideal conditions will occur. If only a small percentage of the seeds from each plant could grow to maturity, orchids would soon be as common as grass.

While there is tremendous variation in the form and structure of the many kinds, all of them have one distinctive feature which separates them from other plants. This is the column, an elongation of the floral axis, which bears the reproductive organs.

Orchids are insect-pollinated and have no provision for self-pollination. Their floral structure is especially adapted to the visits of certain insects. It is believed that many orchids can be pollinated only by a particular species of insect. Failing to attract the right insect by their nectar, colour, and fragrance, they produce no seed.

All orchids are perennial herbs. Most of the tropical orchids grow as epiphytes—not parasites. Epiphytes merely use other plants as supports, having themselves no direct connection with the ground, but parasites, like dodder and mistletoe, obtain their nourishment from the host plant. Many of the epiphytic species bear pseudobulbs—large swollen branches which are reservoirs of food and water. Epiphytic orchids absorb moisture from the humid air through their aerial, hanging, cord-like roots covered by a layer of water-absorbing tissue (velamen). Most orchids are terrestrial, as are all those occurring in British Columbia. With a few exceptions, terrestrial orchids are independent and produce their own food by the process of photosynthesis. The coral roots, however, live on decayed organic matter and are considered saprophytes. They do not possess leaves or true roots, but have an

underground fungus-infested rhizome. Most of our orchids grow in cool, boggy, acid soil, rich in organic matter, where their roots are often associated with certain fungi, making them extremely difficult to transplant and cultivate in gardens.

Some orchids are of economic value to man. For example, *Vanilla planifolia* is the source of our vanilla flavouring. A few orchids have been utilized medicinally. One worth mentioning is the yellow lady's-slipper, the powdered roots of which are used as a drug in nerve medicines. A few others have miscellaneous uses as a source of food, glue, resin, etc. A very large number of tropical species, especially of the genus *Cattleya*, are cultivated for their odd and striking flowers, and many hundreds of horticultural varieties have been produced by hybridization. Because of their spectacular beauty, they are in great demand and are the basis of a multimillion-dollar floral industry.

The wild orchids of British Columbia include many delightful and interesting plants which are well worth knowing and searching for, and worth the effort of self-control involved in refusing to pick them. Since coloured photography has become so popular, it is now easy to capture their beauty for all time without removing them from their habitat. This is an interesting and rewarding hobby through which one can become acquainted with the orchids without causing them any harm.

FLORAL PARTS OF ORCHIDS AND THEIR FUNCTIONS

The inflorescence of orchids consists of one or more flowers and is a spike or simple raceme. However, a formal description does not suffice to explain the orchid flower as it is so highly specialized and modified. The following is a more detailed description illustrated by diagrams.

The orchid flower is zygomorphic; that is, it is divisible into equal halves in one plane only (usually the anterior-posterior plane) (*See* Fig. 1). Its perianth is composed of three petals and three sepals. The sepals, as a rule, are not green, but are coloured like the petals. The two lateral sepals are alike, but the third, the dorsal one, usually differs somewhat in size and shape. The same

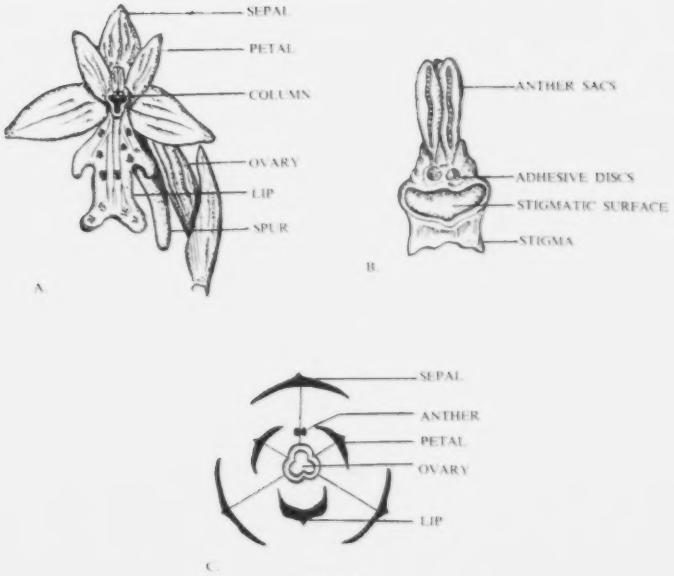


Fig. 1.

A. Single flower of *Orchis*, showing floristic structure.

B. The column, which terminates in the stigma and bears the stamen (enlarged).

C. Floral diagram of *Orchis*.

applies to the petals, as one of the three petals is larger than the other two and modified into a lip (labellum). This lip is usually brilliantly coloured and may be pouched, forked, or expanded. In many cases the lip stretches backwards to form a spur, characteristic of certain species. In some species this spur is long and slender, while in others it is short or pouch-shaped (*see* Figs. 2 and 3). Previously, botanists supposed that the lip was formed by the union of two stamens, but later it was learned from anatomical studies that there was no vascular tissue of staminal origin involved, and that the lip is one of the three segments of the inner

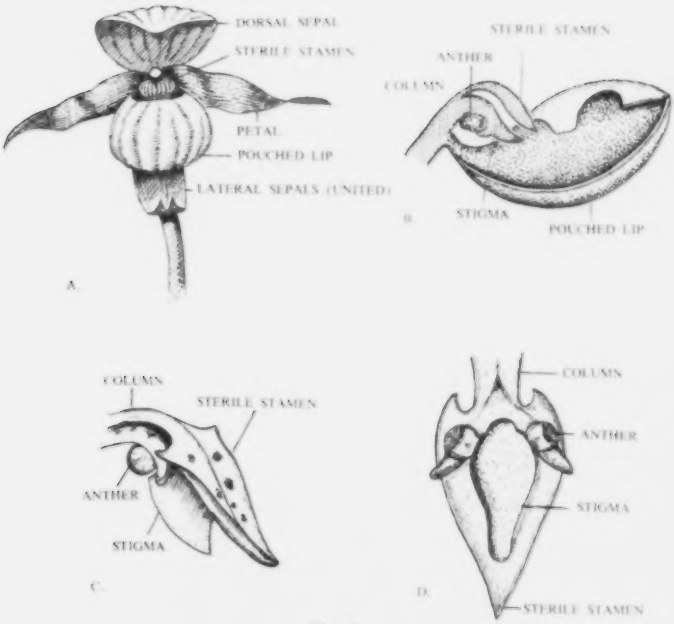


Fig. 2.

A. Yellow lady's-slipper (*Cypripedium*), showing floristic structure.
B. Longitudinal section of flower.
C. Column, showing details of reproductive organs (side view, enlarged).
D. Same, viewed from below (enlarged).

perianth whorl (*see* Fig. 1, C). Most probably the lip is actually an upper petal twisted half-way around from the 12 o'clock to 6 o'clock position. Its function is as a landing-strip for insects in connection with pollination. Rein-orchid (*Habenaria*) is an excellent example of this. An examination of its ovary will reveal distinct grooves indicating the twisting. Note the drawing (Fig. 3, B) of the untwisted ovary of *Habenaria*, where the lip is back in its original position. This extraordinary reverse in the position of the petal, achieved by twisting, helps insect pollination.

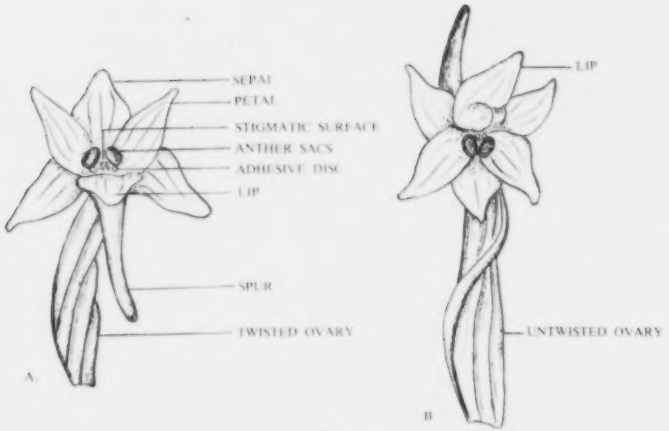


Fig. 3.

A. Rein-orchid (*Habenaria*), single flower, showing floristic structure.
B. Untwisted flower, showing lip in position as an upper petal.
(Diagram after J. Lauderm lk.)

The reproductive parts of the flower, stamens and style, are united and form a thickened organ known as the "column." This structure is very variable and may involve from one to three anthers (*see* Fig. 2, C and D). Sometimes two of them are fertile and the third is sterile and forms a leaf-like structure (staminode) projecting over the stigma. Often there is only one fertile anther with two pollen masses, on either side of the stigma. The column itself varies in shape within the genera and may be elongated and projecting over the stigma. At the summit of the column the pollen is more or less exposed, cohering in small masses (pollinia), and variously provided with an elaborate mechanism which affixes it to the bodies of visiting insects. Below the pollen is quite a large stigmatic surface. The ovary is inferior, and has one or three chambers. The ovary, with the surrounding tissues of the stem in which it is immersed, becomes a capsule, usually three-angled.

All orchid flowers represent a reduction from the primitive ancestral type, since in male reproductive organs, the androecium

(originally of six stamens in two whorls), two general conditions have developed: In the more primitive subfamily *Diandræ*, two of the outer stamens have been suppressed completely and the third is recognizable as a conspicuous staminode. One of the inner whorl has been completely suppressed and the two remaining are functional stamens situated on either side of the column. In the *Monandræ* (the subfamily containing the great majority of the genera) two of the outer whorl of stamens have been suppressed and the third is present (fused with the style and stigma) as the one functional stamen situated terminally on the column, while all three stamens of the inner whorl have been suppressed.

THE PROCESS OF POLLINATION IN ORCHIDS

The process of evolution has carried the orchid family farther than any other class of plants in avoiding self-pollination, by involving a series of physical and chemical operations, necessary for pollination to be effective. Rein-orchid (*Habenaria*) (*see* Fig. 3) is chosen to illustrate this interesting phenomenon, so accurately described by J. Laudermilk (1950). Here is how he describes it:—

"If you carefully examine a single flower through a magnifying glass, you will notice that at the far end of the lip is the opening to the nectary. Viewed from the outside, this honey-vase forms the dangling spur. Right above the opening to the nectary in almost exactly the same location where a normal human throat sports a pair of tonsils, you will notice a pair of curious little objects. These are the anther sacs, all that evolution has left of the stamens. Here we have two tiny cases filled with pollen, and unlike the majority of flowering plants, in which the anthers are fastened to the ends of the filaments or stamen stalks, this plant has eliminated the filaments altogether and set the anthers snugly against the back of the throat, and, to be of any use in rein-orchid society the pollen enclosed in the anther sacs has to come into contact with the stigma of another rein-orchid flower. Their pollen supply is sealed up in the anther sacs. Moreover, it comes packaged in neat little clusters tied up with microscopic threads of wax. These clusters are called the pollinia, and since their operation has to be surefire, nature and evolution have so engineered things

within these microscopic clusters of living cells that at the right time each pollinium will become a tiny, automatic machine.

"The fact that the pollinia are scheduled to function not at once but after the elapse of a few seconds is just another of those profound facts that make the study of nature worth anything you may have to put into it.

"In a flower that has not been robbed by a species of insect a good magnifier shows that just beneath each pollinium there is a tiny green disc. Each disc has a sticky surface. Barely touch this surface with the finest needle you can get, and the disc clings to the side of the needle with almost intelligent determination. This is the first step in a series of physical and chemical operations that are absolutely necessary for pollination to be effective.

"When you pull out the needle with the disc sticking to it, the same action causes the anther sacs to split down the sides, and the pollinia are pulled out standing upright like two clubs balanced on their knobs.

"Now, when the insect comes to sample the nectar, she drinks it through her proboscis—a long, hollow tube fastened to the front of her face. This proboscis is a pump and works like a soda straw. When she shoves it down into the nectary, her head and the upper part of her proboscis are certain to bump against the adhesive discs, which stick and hold fast exactly as they did on the needle. None of this pollen can possibly reach the stigmatic surface of this same flower.

"When first pulled out, the pollinia stand upright exactly as they did on the needle. In this position they can't touch anything for a few seconds.

"It takes the insect quite a while to finish robbing the flower, because the inside of the nectarium is lined with an unusual type of hair. This makes the insect take her time at the job, since she has to thread her proboscis carefully through the barricade before she reaches the nectar. The delay is absolutely essential, for it takes a few seconds for the cement on the adhesive disc to set firmly so that the pollinia will not be displaced in the next series of operations.

" By the time the cement has set, the pollinia themselves have dried out and as they shrink they bend over parallel to the sides of the proboscis and now point straight ahead. By this time the nectary has been thoroughly robbed. The insect pulls out her proboscis and visits a new flower. Here, contact of the pollinia with the stigmatic surface is now as inevitable as no-contact was when the pollinia stood upright. All these fine adjustments and synchronization of time, dehydration, surface tension, etc., are wonderful enough, but there is even more to the story than this. The stigmatic surface is also adhesive, but in a different way from the discs. Here the stickiness is more of the type you find on a piece of ' Scotch tape '; that is, it is a sort of superficial gumminess. Since no single flower needs all the pollen in the pollinia, only enough grains are pulled from the cluster to ensure fertilization. This is the point at which the degree of adhesiveness of the stigmatic surface is of supreme importance. If it were less sticky, too few grains would cling to it; if more so, the whole pollinium would be pulled from the insect's proboscis and thousands of grains would be wasted. All this complicated procedure has to assure production of seeds in the struggle for existence."

NOMENCLATURE

In speaking of plants, the botanist finds it necessary to use technical names for them rather than the common names of spoken language, and the interested layman soon finds that it is best for him also to become familiar with botanical names, forbidding as they may seem at first sight. For instance, the name lady's-slipper has unfortunately been used for several orchids superficially more or less alike but only related. One can give many examples of the confusion inherent in colloquial names, without even drawing attention to the fact that all such names are useless as soon as we pass into a country in which English is not spoken.

Botanical names are always in Latin form, whether they are actually derived from Latin or not. These names are recognized throughout the world, and under the International Code of Botanical Nomenclature the same name can never be correctly applied to more than one kind of plant.

Botanical names are really quite simple; they are based on the classification of plants. The unit in botanical classification is the species; e.g., all the calypsos represent one species, all the heart-leaved twayblades another. Related species having certain main characters in common are brought together to form a genus; all the lady's-slippers are in one genus, *Cypripedium;* all the twayblades belong to the genus *Listera,* etc. Each genus (the plural is genera) has a name formed of a single word, usually a Latin name. The name of the species is made up of two words, the first being the name of the genus to which it belongs, the second a qualifying word, usually a Latin adjective. *Cypripedium montanum, Listera cordata, Habenaria saccata* are the names of species. Within the species the botanist often distinguishes groups set off by less evident differences (slight differences in form or colour or pubescence, for instance); such groups may be called "subspecies," "varieties," or "forms," and are named by adding further qualifying words to the name of the species; for example, *Cypripedium calceolus* var. *pubscens* and *Habenaria viridis* var. *bracteata* are the names of varieties.

Going in the other direction, we arrange genera in larger groups called "families." Each family is named by a single word usually ending in "aceæ." *Orchidaceæ* is the name of the family to which all the orchid genera belong. The families again compose the larger groups of the plant kingdom.

A valid botanical name has at least three parts—a generic name, a specific name, and the name of a person or persons (usually abbreviated) who first described the plant. The varietal name, if necessary, is placed after the authority for the specific name. It is also followed by its authority and is usually preceded by the abbreviation "var." for variety. There are reasons why it is important to record the name of the author who first gave the name to a species. If a later author transfers a species from one genus to another, the name of the first one is placed in parentheses followed by the name of the second author; e.g., *Habenaria dilatata* (Pursh) Hook. This scientific name for the tall white bog-orchid tells us that it was first named by Pursh but as belonging to another genus (*Orchis* in this case) and was later transferred to the genus *Habenaria* by Hooker.

CLASSIFICATION OF ORCHIDS

Recent reclassification of the orchids, from a world-wide viewpoint, was done by Schlechter (1926), wherein he aligned the 610 genera recognized by him into two subfamilies, four tribes, and eighty-one subtribes. Classification of orchids indigenous to the United States and Canada was done by Ames (1924), *Enumeration of the Orchids of the United States and Canada.* It is rather a conservative treatment, agreeing in the main with that of Schlechter, but not recognizing as many genera as Schlechter held to be valid entities.

The most recent work covering the North American orchids is by Correll (1950), *Native Orchids of North America, North of Mexico,* wherein he recognizes 46 genera and 171 species and their varieties. It assembles for the first time an account of all of the North American orchids north of Mexico yet recorded, with a detailed description and discussion of each species. It is a very comprehensive and satisfying treatment.

In this handbook the arrangement of genera follows the phylogenetic system of classification proposed by Schlechter. The primitive genera are followed by the more advanced. The species within each genus, however, are arranged alphabetically and are numbered to facilitate reference.

IDENTIFICATION OF ORCHIDS (USE OF KEYS)

In this handbook you will find a key to the genera, and further keys to the species within those genera which have more than one species. The construction of keys is artificial, and there is no relationship among the genera or species.

To enable you to identify the orchids found, you can follow this simple key, specially constructed for the purpose.

The key is merely an easy means of following through a set of contrasting characters until one comes to a single group which applies to the orchid in question, abandoning its unsuited alternates. This continued progression by the elimination of non-pertinent descriptions will eventually bring one to a genus or species giving

the right name of the orchid. After finding the name of the orchid in the key, one should check the identification by reading over the description of the text and comparing the specimen with the illustration.

DISTRIBUTION OF ORCHIDS IN BRITISH COLUMBIA

Each species has its own distribution map, based entirely on records obtained from the following herbaria: Provincial Museum, Victoria; University of British Columbia, Vancouver; Science Service, Ottawa; University of Washington, Seattle; and W. A. Newcombe, Victoria (private collection).

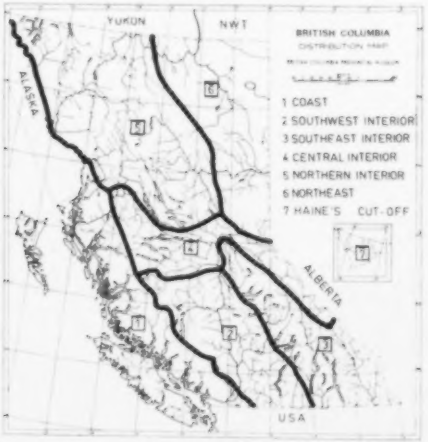


Fig. 4. Regions of British Columbia for which orchid localities are discussed in the text.

Due to lack of collection in many areas of the Province, the maps cannot give a complete picture, but only a general idea of the climatic regions in which a species may occur in favourable habitats.

The regions as shown in the distribution map (Fig. 4) have been based upon those on the climatic region map in the *British*

Columbia Atlas of Resources, 1956. Therefore, British Columbia has been divided into three major climatic regions—namely, the Coast, Interior, and Northeast. This threefold division reflects the basic land-form pattern of the Province and emphasizes the importance of topographic features such as the Coast Mountains and the Rocky Mountains as climatic divides.

Haines Cut-off is not included in the Coast and is discussed as a separate region.

The Interior is broken down into four subregions reflecting topographic and latitudinal influences—namely, Southwest Interior, Southeast Interior, Central Interior, and Northern Interior.

The Northeast region is on similar latitudes to the Northern Interior but has more extreme conditions as it is not influenced by a maritime climate.

HERE TO-DAY—GONE TO-MORROW

Many admirers of the beauty of our wild orchids instinctively pick them on sight. They may realize too late, if they ever think about it, that in the act of picking these flowers they have contributed to the ultimate destruction of the species.

Our orchids are all perennial herbs and, therefore, dependent on food stored within their underground reservoirs, where it is held in reserve to start growth in the following season. When the leaves are picked, the plant's chance of making and storing food for the next season's growth is destroyed. Because many orchids have leafy stems, their blossoms cannot be picked without the accompanying leaves. We must remember that in picking the flowers we also prevent the formation of seed. While many wildflowers are so plentiful that one may disregard these facts, the preservation of native orchids permits no exceptions, and thoughtless picking speeds destruction. The picking of native orchids is forbidden by conservation laws in many States in the United States.

Since the days of virgin woods, before man came with ploughs and axes, many changes have taken place to alter the wildflower population of our Province. Industrial progress and the advance of civilization have unavoidably destroyed natural riches. Orchids

in particular cannot survive the radical changes of their environment. Endless destructive forces which are beyond our control, such as fire which ravages our forests, rain which washes away the precious topsoil, the live stock which graze the undergrowth, and the cities that grow and grow, undoubtedly have wiped out many of them. Fewer and fewer are around us because their natural haunts are disappearing. Many British Columbia orchids, therefore, will never bloom at their usual appointed times, being replaced by more aggressive, tolerant weeds. They will disappear from their original range, taking with them the true natural beauty and floristic character of the Province.

KEY TO THE GENERA

A. Plants without green leaves, saprophytic.
  Lip conspicuously saccate at the base; whole plant white; rhizome not coralloid ..... *Cephalanthera*
  Lip not conspicuously saccate at the base; herbage yellowish or reddish brown; rhizome coralloid (composed of short underground branches, symbiotic with fungi) ..... *Corallorhiza*

AA. Plants with green leaves (these sometimes withered before anthesis).
  B. Lip a large inflated sac or pouch (over 1 cm. long).
    Leaves, 2 or more; roots coarsely fibrous; fertile anther, 2, borne laterally on the column ..... *Cypripedium*
    Leaf, 1; plant arising from a small corm; fertile anther, 1 ..... *Calypso*
  BB. Lip not sac or pouch-like, or if so, then small (not over 1 cm. long).
    C. Flowers with a distinct spur projecting downward from the base of the lip.
      Flowers white or greenish; the spur as long as the body or longer; pollinia glands naked ..... *Habenaria*
      Flowers spotted with red; pollinia enclosed in pouch-like structure ..... *Orchis*
    CC. Flowers without a spur (the lip may be somewhat saccate at the base).
      D. Leaves, many, in a basal rosette, or if cauline, solitary.
        Leaves fleshy and evergreen, clustered at the base of stem, mostly whitish-mottled ..... *Goodyera*
        Leaves membranaceous, soon shrivelling, not whitish-mottled ..... *Malaxis*

DD. Leaves, 2 or more, not in a basal rosette; at least some of them cauline.

E. Leaves, 2, opposite or sub-opposite.

Stem arising from fibrous roots; leaves sessile, opposite at about the middle of the stem; lip 2-lobed or 2-cleft at summit ..... *Listera*

Stem arising from a slender or swollen base; leaves, with expanded blades on the stem above the base; lip entire ..... *Malaxis*

EE. Leaves, more than 2.

Flowers 1 to 2 cm. long, green or purplish; inflorescence a lax leafy bracted raceme, sepals and petals separated ..... *Epipactis*

Flowers less than 1 cm. long; white or cream-coloured; spirally arranged in a dense spike; sepals and petals more or less united ..... *Spiranthes*

CYPRIPEDIUM L. (LADY'S-SLIPPER)

The name *Cypripedium* comes from two Greek words "kupris," a name for Aphrodite, and "pedilion," a shoe, and means, literally, "Aphrodite's shoe."

Lady's-slippers are glandular and pubescent herbs, with coarse, fibrous roots. Their stem is erect and leafy, with large, broad, several-nerved leaves, sheathing at the base. Flowers single, or sometimes two or three, are showy and arranged in a terminal raceme, subtended by foliaceous bracts. Sepals and lateral petals somewhat differentiated, widely spreading, the two lower sepals usually partially or wholly united under the large inflated pouch (sac-like lip), with its margins more or less inrolled around the orifice. Column declined over the orifice of the lip, bearing two fertile anthers on each side and a sterile one covering the summit of the column. Pollen granular. Stigma obscurely 3-lobed. Ovary 1-celled.

Of all our native orchids, the lady's-slippers are the most familiar and are recognized by laymen as wild orchids. They are still regarded in this continent and in Europe as the most attractive terrestrial orchid. Along with the other three genera of this group, they are considered to be the most primitive orchids, distinct as a

Yellow lady's-slipper (*Cypripedium calceolus* L. var. *pubescens* (Willd.) Correll). Plant about half natural size.

group and isolated from the rest of the family. Darwin claimed that lady's-slippers differ from all other orchids much more than any other two genera from each other. The single anther which is present in all other orchids is rudimentary in lady's-slippers and is represented by a singular shield-like projecting body and arches over the stigma. They are so different from all the other orchids that Darwin thought that an enormous wave of extinction must have swept away a multitude of intermediate forms and left this genus, now widely distributed, as a record of the former more simple state of the large group of orchids.

There are about fifty species in boreal, temperate, and tropical regions in Europe, Asia, and America. Of these, only three species occur in British Columbia.

A. Lip deep yellow to pale yellow, often veined or spotted with purple on the inner surface ..... *C. calceolus* var. *pubescens*

AA. Lip white or pinkish, tinged or veined with purple.

Sepals shorter than the lip; lip obovoid, white to pale purple, spotted with violet-purple ..... *C. passerinum*

Sepals longer than the lip; lip globose, white tinged with purple ..... *C. montanum*

Cypripedium calceolus L. var. *pubescens* (Willd.) Correll
Yellow Lady's-slipper

SYNONYMS.—*Cypripedium parviflorum* Salisb.; *C. parviflorum* var. *pubescens* (Willd.) Knight; *C. calceolus* var. *parviflorum* (Salisb.) Fernald.

OTHER COMMON NAMES.—Golden slipper, yellow moccasin-flower, yellow Indian-shoe, yellow Noah's ark.

DESCRIPTION.—*Stem:* Glandular-pubescent, leafy, up to 60 cm., or even more, produced from a rhizome. *Leaves:* 3–5, up to 20 cm. long, broad, oval to lanceolate, ciliate on veins and margin. *Flowers:* 1–3, racemose, each subtended by an erect foliaceous bract. *Sepals:* Greenish-yellow to crimson-purple; upper sepal ovate to ovate-lanceolate, up to 8 cm. long, often undulate; lower sepals united, 2-toothed at the apex. *Petals:* Coloured like the sepals, lance-linear, strongly spiralled, up to 10 cm. long. *Lip:* Yellow, usually veined with purple, pouch- or slipper-shaped, 2–6

cm. long. *Staminode:* Bright yellow, spotted with purple, supported by a thick fleshy stalk. *Capsule:* Ellipsoid.

HABITAT.—Mossy swamps and woods, damp shores, along mountain brooks, occasionally on damp rocky hillsides and wet woods.

SEASON.—From May in south and to August in extreme north.

RANGE.—British Columbia, Yukon to Newfoundland; south to Oregon, Arizona, Colorado, New Mexico; in the east through New England to Georgia and west to Texas.

DISTRIBUTION IN BRITISH COLUMBIA.—Generally distributed and most common in the Southwest and Southeast Interior; scattered also in Northeast and Northern Interior, where it is locally fairly common. Not collected in Central Interior and on the Coast.

COMMENTS.—The name of the species *calceolus,* meaning "a little shoe," refers to the shape of the lip. The typical form of yellow lady's-slipper (*C. calceolus* L.) is one of the few circumboreal species of orchids, which is found throughout Europe and extending into Asia (Himalayan Mountains). According to Correll (1950): "It is represented in North America by the trans-

continental yellow lady's-slipper, var. *pubescens*. The North American yellow lady's-slipper differs from the typical form in its polymorphic tendency—varying in the shape of the staminode, in the size of the flowers and in the colouration of the flowers. Flowers of the more northern and intermediate forms of the yellow lady's-slipper approach the typical form very closely and are also strongly odoriferous as in typical *C. calceolus*." He also says: "A large number of species and varieties have been proposed for our yellow lady's-slipper, based primarily on the size and colour of the flowers. It is difficult to recognize one form without having to recognize several. In my opinion, this plant should be recognized only as a polymorphic variety. However, some botanists recognize the small-flowered variety *parviflorum* (Salisb.) Fernald as distinct. This is a relatively northern plant which usually grows in wetter places than the large-flowered plant. Its lip is arbitrarily considered to be 3 cm. or less long."

I have seen this orchid in great abundance along the Alaska Highway near Summit Pass, where it grows in large colonies on dry gravelly soil exposed to the full sun. This is a most unexpected habitat.

The glandular hairs of yellow lady's-slipper may cause skin irritation in some individuals, similar to that caused by poison ivy. It is interesting that apparently the irritating action increases with the seasonal development of the plant and reaches its maximum with the formation of seeds.

Cypripedium montanum Dougl. Mountain Lady's-slipper

SYNONYMS.—*Cypripedium occidentale* S. Wats.

OTHER COMMON NAMES.—Large lady's-slipper, moccasin-flower, white lady's-slipper.

DESCRIPTION.—*Stem:* Leafy, from short stout rhizome, up to 70 cm. high, glandular-pubescent throughout, with a few brown tubular sheaths at the base. *Leaves:* 4–6, ovate to broadly lanceolate, acute or abruptly short-acuminate, glandular-pubescent on the veins, up to 15 cm. long and 8 cm. wide. *Flowers:* 1–3, racemose in the axils of the foliaceus bracts. *Sepals:* Dark green or brownish-purple, lanceolate, 4–6 cm. long; dorsal sepal long-acuminate,

Mountain lady's-slipper (*Cypripedium montanum* Dougl.).
Plant about half natural size.

somewhat undulate on the margins; lateral sepals united almost to the apex. *Petals:* Dark green or brownish-purple, linear or linear-lanceolate, twisted and pilose at the base. *Lip:* Globose, 2–3 cm. long and about 1.5 cm. deep and wide, white tinged and veined with purple. *Staminode:* Oblong-ovate, about 10 mm. long, yellow with purple spots, channelled above. *Stigma:* Shorter than the sterile stamen. *Capsule:* Suberect, oblong, 2–3 cm. long.

HABITAT.—In moist or dry open woods, occasionally in bush land and swamps, most commonly on subalpine slopes in cool rich humus.

SEASON.—May to July.

RANGE.—Alaska, British Columbia to Saskatchewan, and south to California, Montana, Wyoming, and Idaho.

DISTRIBUTION IN BRITISH COLUMBIA.—Limited to Southwest and Southeast Interior, where it is well distributed, with two other interesting localities—one in Telegraph Creek area and the other on Vancouver Island near Victoria.

COMMENTS.—The name of the species comes from the Latin *montanum*, meaning " of the mountains," as this is its usual habitat.

It is easy to distinguish from yellow lady's-slipper, which it resembles very closely, by its distinctive white lip with pink or purplish lines and sterile yellow anther (staminode) with purple spots, about 1 cm. long. The mountain lady's-slipper is perhaps the loveliest of all our British Columbia orchids and attracts attention wherever it occurs. The flowers are delightfully sweet-scented.

The species has been apparently exterminated on Vancouver Island, where it was originally found near Victoria. As recorded by Macoun in the *Catalogue of Canadian Plants* (1888), it was collected in woods near Cadboro Bay (King) and in the vicinity of Victoria (Fletcher). In the Provincial Museum, Victoria, B.C., is another specimen collected by J. Cowley (1873) from an unknown locality on Vancouver Island. Recently reported (1958) by R. Huckin and seen by J. E. Underhill and A. F. Szczawinski on the Malahat, near Victoria.

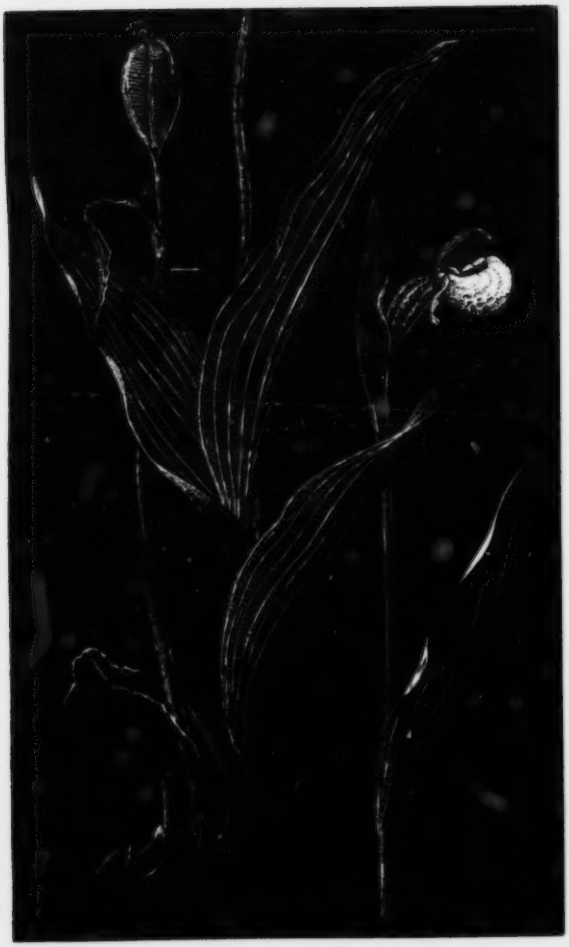
Cypripedium passerinum Richards

Sparrow's-egg Lady's-slipper

SYNONYM.—*Cypripedium passerinum* var. *minganense* Victorin.

OTHER COMMON NAMES.—Franklin's lady's-slipper, purple-spot white-slipper, small white lady's-slipper, small white northern lady's-slipper.

DESCRIPTION.—*Stem:* Up to 35 cm. high, leafy, densely villous-pubescent, produced from slender, creeping rhizome. *Leaves:* 3–5, obovate to lanceolate, clasping, up to 15 cm. long and 5 cm. wide, more or less viscid-villous. *Flowers:* Solitary, rarely 2, on a stiff shaggy peduncle, fragrant; floral bracts foliaceous, ovate-lanceolate, up to 8 cm. long. *Sepals:* Greenish, pubescent on the outer surface; lateral ones free almost to the base or nearly united to the apex, to form an elliptic lamina. *Petals:* White, not twisted, linear-elliptic, rounded at the apex; sepals and petals about 1.5 cm. long. *Lip:* White to pale magenta, somewhat pear-shaped, up to 2 cm. long, with purple spots inside; an opening provided with an infolded flap on each side. *Staminode:* Yellow spotted with reddish-brown, about 5 mm. long. *Capsule:* Erect, obovoid, about 2 cm. long.



Sparrow's-egg lady's-slipper (*Cypripedium passerinum* Richards).
Plant about two-thirds natural size.

HABITAT.—Mossy woods, wet coniferous humus, lake-margins, borders of streams, gravel outwashes and talus slopes in the north.

SEASON.—June to beginning of August.

RANGE.—Alaska, Yukon, British Columbia to Quebec.

DISTRIBUTION IN BRITISH COLUMBIA.—It is essentially a far northern plant and occurs most commonly in the Northern Interior and Northeast. The most interesting records are those of P. Martin and R. Ritcey (1950) at Clearwater Lake in Wells Gray Park and W. B. Anderson (1922) at Windermere in the Southeast Interior.

COMMENTS.—Sparrow's-egg lady's-slipper was first discovered on one of Sir John Franklin's Arctic expeditions and named *passerinum* because of the superficial resemblance of its lip to the sparrow's egg. It is basically a far northern plant and practically transcontinental in its distribution. The sparrow's-egg lady's-slipper grows in the north in neutral, limestone, and even in acid humus on lake-margins. I have seen large colonies of it in a few places along the Alaska Highway in British Columbia. It is most common at the Liard River crossing near Summit Pass and Muncho Lake districts. It was interesting to see this orchid growing there on

open gravelly outwashes in association with *Dryas drummondii* and *Orchis rotundifolia*. The flowers differ from other lady's-slippers in the characteristic and unmistakable lip, which is pure white, soft, and superficially like a sparrow's egg; the auricle of the lip shows a network of veins and the inside is marked with round spots of bright purple.

ORCHIS L. (ORCHIS)

The genus *Orchis* is the type of the family Orchidaceæ. The name is of Greek derivation and refers to a fleshy-thickened root resembling a tuber.

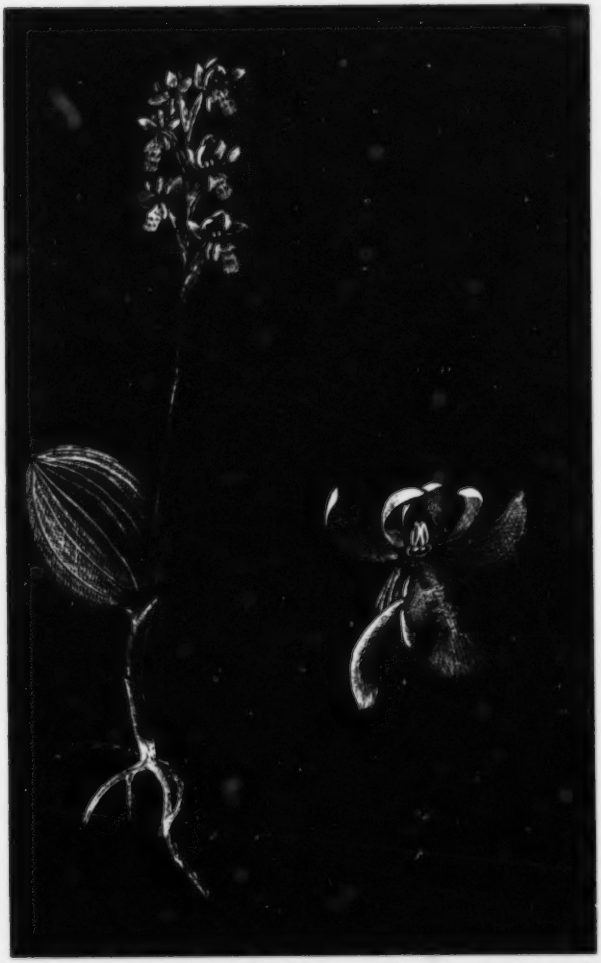
They are succulent terrestrial plants with fibrous and tuberous-thickened roots and scapose or leafy stem. The flowers, few to many, are showy in colour, being purple and white or rose, arranged in a loose raceme. The sepals and petals look much alike, are about equal in size and separate. The lip, connate with the column, is elongated into a prominent spur, simple, or more or less 3-lobed. The anther is composed of two adjoining parallel cells.

This genus includes nearly 100 species found in the temperate zones of Europe and Asia and in the boreal zone of Africa, with just a few occurring in North America. In British Columbia, only one is to be found, growing in cool northern moist and shaded forests, swamps and bogs. Many species of this genus are often difficult to define, and, as a consequence, many varieties and forms have been described, thus creating a taxonomical problem. However, our lone representative of this genus is very easily recognized and cannot be confused with any other orchid.

***Orchis rotundifolia* Banks ex Pursh. One-leaf Orchis**

OTHER COMMON NAMES.—Small round-leaved orchis, mauve-spotted orchis, spotted kirtle-pink.

DESCRIPTION.—*Stem:* Erect, up to 30 cm. tall, glabrous, stoloniferous with fleshy-fibrous roots. *Leaf:* Solitary, orbicular to elliptic, obtuse to rounded at the apex, sub-basal, dull green, up to 10 cm. long. *Inflorescence:* Two- to several-flowered in lax raceme up to 8 cm. long, with lanceolate, acuminate, foliaceous



One-leaf orchis (*Orchis rotundifolia* Banks ex Pursh.). Plant natural size; flower five times natural size.

floral bracts, usually exceeding flowers. *Flowers:* Showy with the pedicellate ovaries about 10 mm. long. *Sepals and Lateral Petals:* White to pale purple, oblong-obovate, about 6 mm. long. *Petals:* Narrower than the sepals; both petals and the upper sepal connivent, the lateral sepals spreading. *Lip:* White, spotted with purple, up to 9 mm. long, deeply 3-lobed at the base, the lateral lobes short-ovate, ascending, the terminal much larger, oblong-spatulate to obcordate, and notched at the summit. *Spur:* Slender, much shorter than the lip, up to 5 mm. *Column:* Short, stout, about 3 mm. long. *Capsule:* Ellipsoid, up to 15 mm. long.

HABITAT.—Moist, cold, or wet forests, swamps, bogs, mossy wet mountain-slopes.

SEASON.—June to July.

RANGE.—Alaska, across Canada, south in Montana and Wyoming; in the east from Vermont through the Lake States to Wisconsin. Also in Greenland.

DISTRIBUTION IN BRITISH COLUMBIA.—Most frequent in Southwest and Northern Interior. Not reported from the Coast, Vancouver Island, or Queen Charlotte Islands.

COMMENTS.—The specific name *rotundifolia* refers to the shape of the leaf. The single roundish basal leaf, a slender leafless stalk, with a loose raceme of a few small delicately tinted flowers serve well to distinguish this orchid. The white lip is very conspicuously spotted with purple and cleft into three lobes.

HABENARIA WILLD. (REIN-ORCHID)

Rein-orchids were called so because of the resemblance in some species of the shape of their lips and spurs to a rein or thong. The derivation of *Habenaria* is from the Latin *habena*, meaning a strap or rein.

Most rein-orchids have simple, glabrous leafy or merely bracteated stems. Leaves from one to few, basal or cauline, sessile, with the basal part sheathing the stem. The flowers in our species are rather small, yellowish-green or white, in loose or dense racemes. Further distinctions are noticed in the character of the lip, which in ours is usually entire, extended at the base into a spur.

Rein-orchids are represented by approximately 500 species, which are natives mainly to the warmer climatic regions of the world. Of these, eleven grow in British Columbia and compose the largest group of all the orchids here. Some of our species prefer the cool northern coniferous forests, and others are confined to warmer bogs, muskeg, and wet meadows. Generally speaking, they are partial to wet habitats.

Rein-orchids are the tallest of our species, but nevertheless are not the most striking as regards colour. The various species are separated on the basis of the colour of their flowers and the shape of their lips and spurs. They are rather difficult to identify because of the narrow margin which separates some closely related species.

Going by externals only, it takes a robust imagination for anybody not initiated into the secrets of plantdom to see any relationship between the unpretentious greenish-white rein-orchid flowers and those elegant mauve or shell-pink "creations" that come out of hothouses. But if you look closely with a lens and poke about with a needle, you will soon find that *Habenaria's* floral architecture holds all the credentials for membership in the Orchidaceæ. For a century, botanists have been of divided opinions as to

whether this large group, diverse in the technical characters of its reproductive organs, should be maintained as a single genus or segregated into several. I agree with the opinion of many leading specialists in the Orchidaceæ that the acceptance of these numerous generic segregates would result in confusion. *Hebenarias* are very variable plants, and it seems best to allow for extreme variations within a given species. Correll's (1950) taxanomical treatment of this genus is adopted in this handbook.

A. Leaves, 1 or 2, basal or essentially so; stem without bracts or provided with a solitary bract at or about the middle.
  B. Lip broad, elliptic to suborbicular, deeply concave; spur scrotiform ..... *H. chorisiana*
  BB. Lip linear, not concave; spur elongated, tapering at the apex.
    Leaf solitary, broadly obovate to linear oblanceolate, erect; spur up to 1.2 cm. long ..... *H. obtusata*
    Leaves, 2, orbicular to broadly oval, spreading on the ground; spur more than 1.2 cm. long ..... *H. orbiculata*

AA. Leaves, several, cauline or sub-basal.
  B. Stem with a few foliacesus bracts; leaves scattered on the stem and persisting after anthesis.
    C. Flowers, usually white, rarely greenish, lip rhombic-lanceolate, dilatated at the base.
      D. Spur one and one-half times as long as the lip or longer ..... *H. dilatata* var. *leucostachys*
      DD. Spur about equal to or shorter than the lip.
        Spur equal or sometimes slightly exceeding the lip ..... *H. dilatata*
        Spur one-half to two-thirds the length of the lip, often clavate ..... *H. dilatata* var. *albiflora*
    CC. Flowers usually green or greenish, sometimes marked with purple, lip linear to broadly lanceolate, not prominently dilated at the base.
      Spur scrotiform or strongly saccate; lip linear to lanceolate; raceme elongate, laxy flowered ..... *H. saccata*
      Spur cylindrical; lip elliptic to lanceolate; raceme short and congested ..... *H. hyperborea*
  BB. Stem with numerous scale-like bracts; leaves clustered at or near the base of stem, usually withering before or during anthesis.
    Spur about equal to the lip; raceme laxy flowered ..... *H. unalascensis*
    Spur twice or more longer than the lip; raceme densely flowered ..... *H. unalascensis* var. *elata*

BBB. Stem leafy, leaves variable, not clustered at or near the base of stem; and persisting after anthesis; spur scrotiform much shorter than the pedicellate ovary ..... *H. viridis* var. *bracteata*

Habenaria chorisiana Cham. Chamisso's Orchid

SYNONYMS.—*Pseudodiphryllum chorisianum* (Cham.) Nevski.; *Limnorchis chorisiana* (Cham.) J. P. Anders.

DESCRIPTION.—*Stem:* Slender, glabrous, up to 20 cm. tall from fleshy roots. *Leaves:* Sub-basal (sometimes midway on the stem), 2 or rarely 1, sub-opposite, ovate, lanceolate or elliptic, obtuse to acute, up to 8 cm. long. *Raceme:* Spicate up to 20 flowers; floral bracts triangular-ovate, up to 1.5 cm. long, exceeding the flowers. *Flowers:* Small with thick scarcely spreading segments. *Sepals:* About 2 mm. long and 1 mm. wide, oblong-quadrate to oblong obovate. *Petals:* Same size as sepals, suborbicular-ovate, rounded at the apex. *Lip:* Entire, orbicular, rounded at the apex, very fleshy, up to 2.5 mm. long. *Spur:* Short, scrotiform, about 1 mm. long.

HABITAT.—Swamps near the sea, sphagnum bogs, generally wet habitat, often overlooked since it is small and is imbedded in sphagnum moss.

SEASON.—July and August.

RANGE.—Alaska, British Columbia. Also Japan.

DISTRIBUTION IN BRITISH COLUMBIA.—Extremely rare with us. First collected in the Province by John Macoun at Ucluelet and not found again for many years. Reported recently by Calder, Saville, and Taylor from three localities in the Queen Charlotte Islands.

COMMENTS.—The specific name *chorisiana* is after Louis Choris (1795–1828), a Russian artist and traveller. Chamisso's orchid and Behring Island Habenaria (*H. behringiana* (Rydb.) Ames) are undoubtedly the rarest orchids in North America. This species is probably the smallest rein-orchid, as the plant seldom exceeds 5 inches in height. The pair of sub-basal, obtuse leaves and few-flowered inflorescence, arranged in a loose raceme, are very characteristic of this species and make its identification easy. Chamisso's orchid is known in the American continent only from

Chamisso's orchid (*Habenaria chorisiana* Cham.). Plants natural size; flower about three times natural size.

Alaska (Juneau fide Anderson), Aleutian Islands (Adak, Atka, Attu, and Analaska), and British Columbia. It also occurs in Japan. Until 1957 the only record from British Columbia was from Ucluelet on the west coast of Vancouver Island. However, a few additional collections came recently from the Queen Charlotte Islands. Plants of these differ from those collected in the Aleutian Islands and Alaska mainly in height, as the Queen Charlotte Islands specimens reach a height of 7 inches, and very often one of the two sub-opposite leaves is greatly reduced, as shown in the plate. It is one of the rarest and most interesting orchids in our Province.

Habenaria dilatata (Pursh.) Hook. Tall White Bog-orchid

SYNONYMS. — *Orchis dilatata* Pursh.; *Limnorchis dilatata* (Pursh.) Rydb.; *L. foliosa* Rydb.; *L. graminifolia* Rydb.; *Habenaria graminifolia* (Rydb.) Henry.

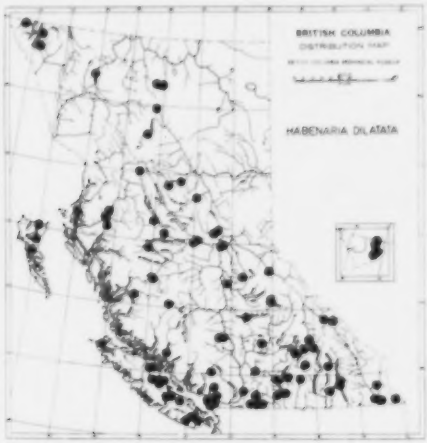
OTHER COMMON NAMES.—Leafy white orchid, boreal bog-orchid, fragrant white orchid.

Tall white bog-orchid (*Habenaria dilatata* (Pursh.) Hook.).
Plant about half natural size; flower about natural size.

DESCRIPTION.—*Plant:* Erect, glabrous, up to 1 m. high from thick elongated, fusiform tubers. *Stem:* Rather slender, leafy. *Leaves:* Lanceolate, the lower obtuse, the upper acute, up to 20 cm. long; the upper foliage leaves smaller and passing gradually into the bracts. *Raceme:* Laxy or densely many-flowered, up to 40 cm. long and up to 4 cm. in diameter; floral bracts lanceolate and exceeding the flowers. *Flowers:* Pure waxy white or greenish-white and sweetly clove-scented. *Sepals:* Dorsal sepal up to 7 mm. long, ovate, erect, and connivent with the petals forming a hood over the column; lateral sepals up to 9 mm. long, elliptic-lanceolate, spreading or reflexed. *Petals:* Ovate-lanceolate, wide at the base, connivent with the dorsal sepal, up to 8 mm. long. *Lip:* Widened at the base into rhomboid forms, apical half linear, usually projecting outward, up to 10 mm. long; spur cylindrical, equaling the lip. *Capsule:* Obliquely ellipsoid.

HABITAT.—Swamps, bogs, marshes, wet meadows, moist seepage slopes, along streams and lake-edges, also in alpine meadows and wet marshy coniferous forests.

SEASON.—June to September in various parts of its range.



RANGE.—Alaska, across Canada, south to California and east in Idaho, Montana, Colorado, Utah, and New Mexico, in the east through New England to New Jersey, Pennsylvania and New York, and inland in Michigan, Wisconsin, Minnesota, and South Dakota. Also in Greenland.

DISTRIBUTION IN BRITISH COLUMBIA. — Found in suitable habitats throughout the Province, but most common in Southern Interior, southeast coast of Vancouver Island, and also very abundant in the Haines Cut-off.

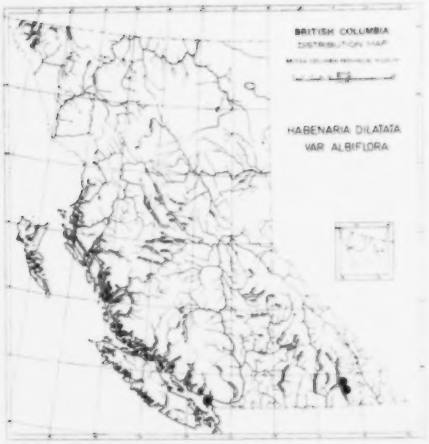
COMMENTS.—The specific name *dilatata* is from a Latin term meaning " expanded " in reference to the widened lower portion of the lip. The tall white bog-orchid, often known as the fragrant white bog-orchid is the most attractive of all our *Habenarias*. The whiteness of its blossoms and delightfully sweet fragrance, like that of cloves or vanilla and syringa combined, make this species remarkably beautiful and easily distinguishable. In general appearance, habit, and, indeed, everything except colour and fragrance, the tall white bog-orchid is very like the tall northern green orchid. In fact, some of the early botanists thought this white orchid and the green one identical, with the floral colour differences due to the presence of light or shade. Nevertheless, the tall white bog-orchid has positive distinguishing characters, of which the most important is the lip, which, being rhombic-lanceolate, is conspicuously dilated at the base and tapers to the apex, while that of the tall northern green orchid tapers uniformly. In many parts of British Columbia plants grow up to a height of 3 feet, and are so abundant that one can see masses of pure white flowers from a distance, and smell their delightful fragrance.

Habenaria dilatata var. *albiflora* (Cham.) Correll

SYNONYMS.—*Habenaria borealis* Cham. var. *albiflora* Cham.; *H. dilatatiformis* Rydb.; *Limnorchis dilatatiformis* Rydb.

COMMON NAME.—Same as species.

This is a short-spurred variant with a dense inflorescence and quite large flowers. This variety usually grows at higher elevations on moist rocky slopes, wet meadows, and marshes along streams.



Some forms of the typical *H. dilatata* approach var. *albiflora*, and it is often difficult to separate them.

RANGE.—Alaska, British Columbia to Alberta, south to Oregon and eastward in Idaho, Montana, Wyoming, Utah, and Colorado.

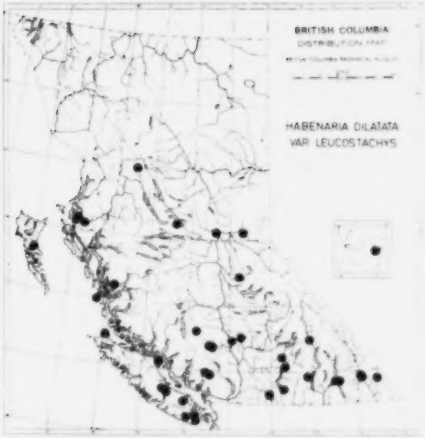
DISTRIBUTION IN BRITISH COLUMBIA.—This variety is restricted in its distribution to the Southeast Interior and to the Coast. Limited distribution does not necessarily mean rarity. This variety has been often classified as a typical form.

Habenaria dilatata var. *leucostachys* (Lindl.) Ames
White-flowered Bog-orchid

SYNONYMS.—*Platanthera leucostachys* Lindl.; *Habenaria leucostachys* (Lindl.) S. Wats.; *H. leptoceratitis* (Rydb.) Henry.

It is very like the typical form but differs in having a long spur which is usually 1 to 2 cm. long. The spur is about one and one-half times to more than twice as long as the lip. It has a habitat similar to that of the typical form and is found quite frequently on higher elevations. The distribution of this variety is confined to Western America.

White-flowered bog-orchid (*Habenaria dilatata* var. *leucostachys* (Lindl.) Ames). Plant about half natural size; flower about twice natural size.



RANGE.—South Alaska, British Columbia, south to California and eastwards in Montana, Nevada, and Utah.

DISTRIBUTION IN BRITISH COLUMBIA.—Apparently quite common, especially in Southwest and Southeast Interior and on the Coast. The collections from the Province are too scattered to give a clear pattern of its distribution, and, therefore, this variety may be expected anywhere in suitable habitat. It seems to be most rare in Northern Interior and Northeast.

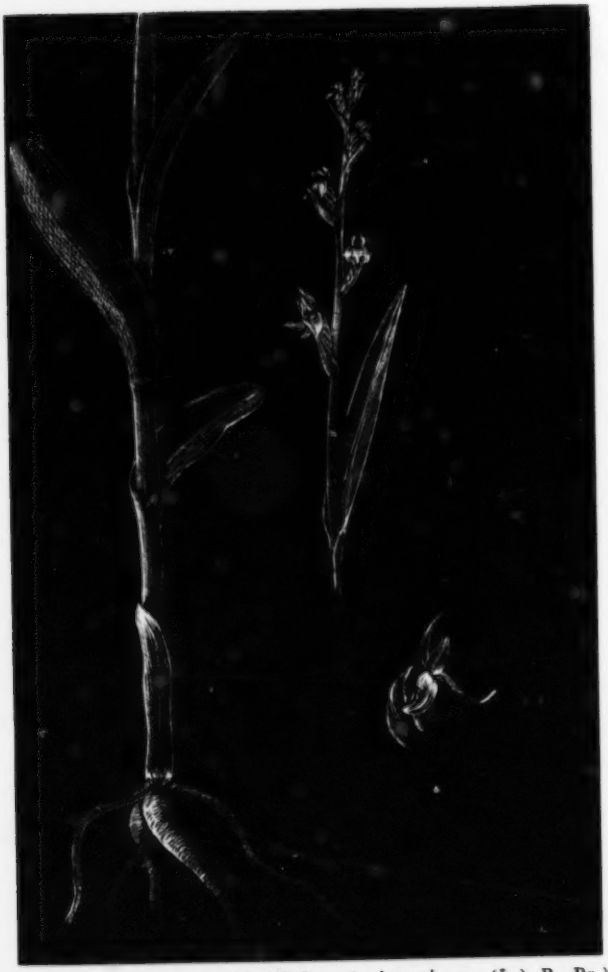
Habenaria hyperborea (L.) R. Br.

Green-flowered Bog-orchid

SYNONYMS.—*Orchis hyperborea* L.; *Habenaria borealis* Cham.; *H. viridiflora* (Cham.) Henry; *Limnorchis hyperborea* (L.) Rydb. *Platanthera hyperborea* (L.) Lindl.

OTHER COMMON NAMES.—Tall northern green orchid.

DESCRIPTION.—*Plant:* Erect, glabrous, up to 50 cm. high or more, from tuberous-thickened roots. *Stem:* Rather thick, soft, usually leafy throughout. *Leaves:* Lanceolate to oblanceolate, up to 25 cm. long and 3 cm. wide; upper foliage leaves smaller and



Green-flowered bog-orchid (*Habenaria hyperborea* (L.) R. Br.).
Plant about half natural size; flower, side view, about natural size.

passing gradually into the bracts. *Flowers:* Green or yellowish-green, in a long, narrow, densely or laxy few- to many-flowered bracted spike; floral bracts lanceolate, the lowermost bracts up to 3 cm. long and greatly exceeding the flowers. *Sepals:* Green, lanceolate; lateral pair spreading or strongly reflexed; dorsal sepal ovate to ovate-elliptic, occasionally minutely hooded at the apex. *Petals:* Similar to lateral sepals, but smaller, paler, and erect. *Lip:* Pale whitish-green, fleshy, lanceolate to sublinear, slender or clavate, about the length of the lip, shorter than the ovary, not more than 10 mm. long; spur cylindrical, usually shorter than the lip, slender to somewhat clavate. *Capsule:* Erect, up to 15 mm. long.

HABITAT.—Open or shady places, peat bogs, muskegs, swamps, marshes, wet woods, and open grassy slopes, along rivers, streams, and lakes; also in wet gravel.

SEASON.—June to August.

RANGE.—Alaska, British Columbia to Newfoundland, south to California; in the east through New England to New York and Pennsylvania and west through the Lake States to Minnesota and South Dakota, then south-west in Nebraska, Colorado, New Mexico, and Arizona. Also in Greenland, Iceland, and Asia.

DISTRIBUTION IN BRITISH COLUMBIA.—Found in suitable habitats throughout the Province, but most common in Southern and Central Interior. Rather scattered in its distribution on the Coast and Vancouver Island. Not collected in Queen Charlotte Islands.

COMMENTS.—The specific name *hyperborea* refers to a Greek term meaning "beyond the north," alluding to the distribution. Green-flowered bog-orchid is one of the few orchids found within the Arctic Circle. It is rather inconspicuous, often small, with greenish or yellowish-green flowers in a rather dense raceme. The leaves are erect, lance-like, sheathing at the base and partly clasping the stout stem, decreasing in size and passing into leafy bracts subtending each flower. One of the most noticeable characteristics of this orchid is its lanceolate lip, uniformly tapering. The absence of localities in the north on the distribution map does not necessarily indicate its rarity, but simply that it has been poorly collected there.

Habenaria obtusata (Banks ex Pursh.) Richards
One-leaved Rein-orchid

SYNONYMS.—*Orchis obtusata* Banks ex Pursh.; *Lysiella obtusata* (Banks ex Pursh.) Rydb.; *Habenaria obtusata* var. *collectanea* Fernald.

OTHER COMMON NAMES.—Blunt-leaf orchid, northern small bog-orchid.

DESCRIPTION.—Plant: Erect, scapose, glabrous throughout, rather small, up to 30 cm. high, forming elongated, slender, fleshy-tuberous roots. *Stem:* Slender, bractless or sometimes with a linear bract at about the middle, 4-angled. *Leaf:* Basal, solitary, oblanceolate to obovate, 5–15 cm. long and 1–5 cm. broad, blunt, long-tapering to a petiole-like base. *Raceme:* Short, loose, few-flowered, up to 15 cm. long with lanceolate bracts, the lowermost often exceeding the flowers, up to 20 mm. long. *Flowers:* Greenish-white with pedicellate ovaries. *Sepals:* Dorsal sepal ovate, rounded at the apex and arching over the column; lateral sepals strongly reflexed, elliptic-lanceolate. *Petals:* Narrow, triangular, lanceolate, curved upward, coming into contact with the dorsal sepal. *Lip:* Pale greenish-white, lance-linear, deflexed, up to 10

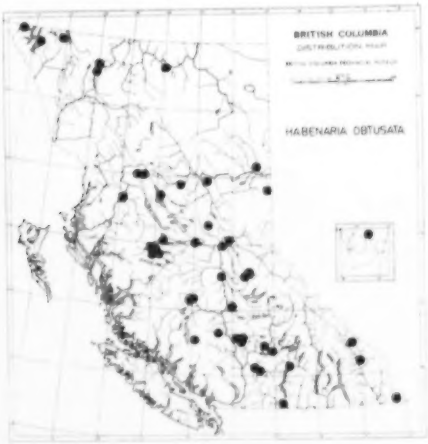
One-leaved rein-orchid (*Habenaria obtusata* (Banks ex Pursh.) Richards). Plant about half natural size; flower about three times natural size.

mm. long; spur, tapering from a rather broad base, slender, pointed, somewhat curving, as long as lip. *Capsule:* Erect, ellipsoid, up to 10 mm. long.

HABITAT.—Cool, damp or wet mossy soils; bogs; moist, open, dense coniferous forests; muskegs; swamps; along stream-banks; and grassy slopes above timber-line.

SEASON.—June to August.

RANGE.—Alaska, British Columbia to Newfoundland, south in Montana, Wyoming, Utah, and Colorado; in the east, south through Maine, New Hampshire, Vermont, and New York and west through northern Michigan, Illinois, Wisconsin, and northern Minnesota. Also in Norway.



DISTRIBUTION IN BRITISH COLUMBIA.—Widely spread throughout the Interior. Rare in Haines Cut-off. Not known from the Coast, Vancouver Island, or Queen Charlotte Islands.

COMMENTS.—The specific name *obtusata* comes from the Latin and means "blunt." This refers to the leaf with rounded appearance at the apex. One-leafed rein-orchid is one of the smallest of our *Habenarias* and also one the hardiest. It has

almost the same geographical range as *H. hyperborea.* This species is often called the blunt-leaf orchid because of the shape of the solitary leaf, so typical of the species. In northern British Columbia it can be seen in profusion, despite the severe environmental conditions.

***Habenaria orbiculata* (Pursh.) Torr.**
Large Round-leaved Orchid

SYNONYMS.—*Orchis orbiculata* Pursh.; *Platanthera orbiculata* (Pursh.) Lindl.; *Habenaria menziesii* (Lindl.) Macoun; *Lysias menziesii* (Lindl.) Rydb.; *L. orbiculata* (Pursh.) Rydb.

OTHER COMMON NAMES.—Moon-set, heal-all.

DESCRIPTION.—*Plant:* Erect, scapose, glabrous, up to 50 cm. high, rising from fleshy fusiform roots. *Stem:* With a pair of basal leaves and above with 1–5 lanceolate bracts. *Leaves:* Orbicular, up to 25 cm. long and up to 15 cm. wide. *Raceme:* Loose, few- to many-flowered, rather wide, up to 30 cm. long with linear-oblong floral bracts, shorter than the flowers. *Flowers:* Sometimes more than 20, whitish-green. *Sepals:* Upper one short, rounded; lateral pair reflexed, falcate-ovate, up to 16 mm. long. *Petals:* Shorter than sepals, ovate to ovate-lanceolate, reflexed, up to 12 mm. long. *Lip:* Oblong-linear or ligulate, blunt, up to 24 mm. long, directed downwards and slightly recurved. *Spur:* Cylindrical, thickened and upcurved toward the tip, up to 45 mm. long. *Column:* With a prominent projection on each side, up to 6 mm. long. *Capsule:* Curved, erect, up to 20 mm. long.

HABITAT.—Swamps, bogs, damp woods rich in humus, moist spots in coniferous forests, occasionally in dry forests and meadows.

SEASON.—Mid-June to August.

RANGE.—Alaska, Yukon, British Columbia to Newfoundland, south to California, Idaho; in the east, south through New England to New York, Pennsylvania, West Virginia, Maryland, and Virginia in the mountains to Carolina and Georgia; through the Lake States to Montana.

DISTRIBUTION IN BRITISH COLUMBIA.—Widely scattered in Central and Southern Interior. Few collections made in the Coast,

Large round-leaved orchid (*Habenaria orbiculata* (Pursh.) Torr.).
Plant about half natural size.

but too scattered to give any idea of the distribution pattern, except that it occurs quite commonly in the Southern Coastal region. Very rare on Vancouver Island. Collected by Toms at Thetis Lake near Victoria in 1929.

COMMENTS.—The specific name *orbiculata* is from the Latin meaning "round," in reference to the shape of the two large basal leaves, characteristic of this species. Large round-leaved orchid is a handsome plant of very striking appearance. Mature plants of this orchid range in height from 1 to 2 feet. The pair of large, succulent, shiny basal leaves, almost circular and spread flat out, and the erect, scapose inflorescence characterize this species. Undoubtedly this is one of the easiest species to distinguish. In many regions this orchid is uncommon, but it thrives quite profusely in a few localities.

Habenaria saccata Greene. Slender Bog-orchid

SYNONYMS.—*Habenaria gracilis* S. Wats.; *H. Stricta* (Lindl.) Rydb.; *H. hyperborea* var. *purpurascens* (Rydb.) Ames; *H. purpurascens* (Rydb.) Tidestrom; *Limnorchis stricta* (Lindl.) Rydb.

Slender bog-orchid (*Habenaria saccata* Greene). Plant about half natural size; flower about natural size.

DESCRIPTION.—*Plant:* Erect, usually slender, glabrous, up to 1 m. high, rising from tuberous, fusiform roots. *Stem:* Leafy, stout. *Leaves:* Lanceolate, acuminate, 5–15 cm. long, gradually diminishing upward into the bracts. *Flowers:* Many in a slender spicate raceme, green, sometimes tinged with purplish-brown. *Sepals:* Thin, 3-nerved, 3–5 mm. long; petals and lip fleshy. *Lip:* 5–7 mm. long, linear, longer than the spur, which is inflated, very obtuse at the tip and often purplish, one-third to two-thirds the length of the lip. *Column:* Short and thick, about 2 mm. long. *Capsule:* Erect up to 15 mm. long.

HABITAT.—Swamps, marshes, bogs, wet meadows, wet coniferous forests, thickets, and occasionally on open grassy seepage slopes and along streams at higher elevation.

SEASON.—Beginning of June to end of August in various localities of its range.

RANGE.—Alaska, British Columbia, Alberta, south to California and eastwards in Idaho, Montana, Wyoming, Nevada, Colorado, Arizona, and New Mexico.

DISTRIBUTION IN BRITISH COLUMBIA.—Widespread and very common on the Coast, especially in the dry southeastern part of Vancouver Island, and Southeast Interior. Rather rare in Central Interior and Northwestern Interior.

COMMENTS.—The specific name *saccata* is from the Latin meaning "bag-shaped," referring to the very characteristic shape of the spur. The plant is slender, glabrous, and light green; it grows up to 3 feet high with a leafy stem. The inflorescence is typically elongated, remote or laxly few- to many-flowered. The most characteristic feature is its scrotiform or saccate spur which separates slender bog-orchids from other rein-orchids. It is a native of western North America, extending its range from the mountains in Arizona to Alaska.

***Habenaria unalascensis* (Spreng.) S. Wats.**

Slender-spire Orchid

SYNONYMS. — *Spiranthes unalascensis* Spreng.; *Habenaria cooperi* S. Wats.; *Piperia unalaschensis* (Spreng.) Rydb.; *P. cooperi* (S. Wats.) Rydb.

OTHER COMMON NAMES.—Alaska orchid, western rein-orchid, Alaska piperia.

DESCRIPTION.—Plant: Scapose, glabrous, up to 90 cm. high, rising from fleshy-fibrous roots with 2 rounded tubers. *Stem:* Leafy at base, bracteate above. *Leaves:* 2–4, in basal cluster, oblanceolate, obtuse, 10–20 cm. long, soon withering; bracts triangular acute or acuminate, shorter than the ovary. *Flowers:* Many, white, greenish or yellowish in a narrow, rather dense spike, 10–40 cm. long. *Sepals and Petals:* Lanceolate, 1-nerved, 2–4 mm. long. *Lip:* Oblong, scarcely exceeding the petals, fleshy, thickened through the centre, 3-nerved, up to 5 mm. long; spur usually about equal to the lip, cylindrical or slightly clavate. *Capsule:* Ellipsoid, up to 10 mm. long.

HABITAT.—Grassy open slopes, meadows, gravelly or sandy soils, dry or damp floor of coniferous forests, chaparral, brush lands, also along rivers and streams.

SEASON.—June to August.

Slender-spire orchid (*Habenaria unalascensis* (Spreng.) S. Wats.). Plant about half natural size; flower about natural size.

RANGE.—Alaska, British Columbia to Quebec, south to California, southwest to Montana, South Dakota, Colorado, Utah, Nevada, and Mexico.

DISTRIBUTION IN BRITISH COLUMBIA.—Most common in the Central Interior, widely spread in the Southwest and Southeast Interior, rather rare on the Coast, with localities near Prince Rupert and on southeast Vancouver Island. In the Northern Interior it is known only from one locality in the Peace River District and was also collected in the Haines Cut-off (1956) by Taylor, Szczawinski, and Bell.

COMMENTS.—The specific name *unalascensis* alludes to Unalaska, most probably the place of original discovery of this species. Slender-spire orchid is very variable in habit. The leaves, which are in a basal cluster on long slender petioles, 2–4 in number, usually wither before or during anthesis. The flowers are characteristically twisted sideways, giving the appearance of an asymmetrical arrangement of their floral segments. Slender-spire orchid is considered to be a typically Western species, but it occurs in a few isolated places in the East. Its tolerance to various environ-

mental conditions is interesting, varying from dry sandy to moist soils and ranging from sea-level to an elevation exceeding 10,000 feet (in Utah).

Habenaria unalascensis var. *elata* (Jepson) Correll
Wood Rein-orchid

SYNONYMS.—*Habenaria elegans* var. *elata* Jepson; *H. elegans* (Lindl.) Bolander; *H. multiflora* (Rydb.) Blankenship; *H. elegans* var. *multiflora* (Rydb.) Peck; *H. michelii* Greene; *Piperia elegans* (Lindl.) Rydb.; *P. multiflora* Rydb; *P. michelii* (Greene) Rydb.

OTHER COMMON NAMES.—Long-spiked piperia, elegant piperia, many-flowered piperia.

DESCRIPTION.—Variety *elata* differs from the species in having an elongated spur which is about twice as long as the lip (10–20 mm.). The racemes are more densely flowered, and the floral segments are larger than in the typical form.

Wood rein-orchid (*Habenaria unalascensis* var. *elata* (Jepson) Correll). Plant about half natural size; flower, front view, about natural size.

HABITAT.—Dry or moist soil in woods, brush lands, open slopes, and ridges.

RANGE.—British Columbia, south to California, and inland in Idaho and Montana.

DISTRIBUTION IN BRITISH COLUMBIA.—Apparently confined to the south; not found north of Williams Lake. It is one of the most common *Habenaria* found on the dry southeastern coast of Vancouver Island and in the Southwest and Southeast Interior, where it is locally fairly abundant.

***Habenaria viridis* (L.) R. Br. var. *bracteata* (Muhl. ex Willd.) A. Gray** **Bracted Orchid**

SYNONYMS.—*Orchis bracteata* Muhl. ex Willd.; *Habenaria bracteata* (Muhl. ex Willd.) R. Br.

OTHER COMMON NAMES.—Long-bracted orchid, long-bracted habenaria, frog-orchid, American frog-orchid.

DESCRIPTION.—*Plant:* Scapose, glabrous throughout, up to 60 cm. tall, from fleshy thickened root-stock. *Stem:* Leafy, the lower of the 2–5 leaves oblong to oblong-obovate and blunt; the upper smaller, narrower and acute. *Raceme:* Rather lax, with prominent sub-ascending foliaceous bracts, linear-lanceolate, acuminate usually two to four times the length of the flowers. *Flowers:* Green or tinged with bronze. *Petals:* Narrowly lanceolate, much narrower than ovate sepals, about 4–6 mm. long. *Lip:* Oblong to oblong-cuneate 2–3-toothed at the apex, up to 10 mm. long (a median tooth rarely developed), two to three times longer than the scrotiform, saccate, whitish spur. *Capsule:* Ellipsoid, up to 10 mm. long.

HABITAT.—Bogs and swamps and open wet grassy slopes, damp woods and thickets, along grassy streams, banks, and lakeshores.

SEASON.—End of May to August.

RANGE.—Alaska, British Columbia to Newfoundland, south to Washington, inland in Montana, Wyoming, Utah, Colorado, and New Mexico; in the east through New England to New Jersey, Pennsylvania, Maryland, Virginia, and North Carolina; through

Bracted orchid (*Habenaria viridis* (L.) R. Br. var. *bracteata* (Muhl. ex Willd.) A. Gray). Plant about half natural size; lip and spur three times natural size.

the Lake States to Minnesota, Iowa, and Nebraska. Also in Iceland and Asia.

DISTRIBUTION IN BRITISH COLUMBIA.—Most common in Central and Southwest Interior and erratically in a few other localities throughout the Province.

COMMENTS.—The specific name *viridis* means "green." The variety name *bracteata* (bractate) refers to the characteristic long floral bracts. The variety *bracteata* is easily recognized by its long, pendent lip unequally tridentate at the apex with a short pouch-shaped spur. The linear-lanceolate lowermost floral bracts exceed the length of the flowers by two to three times. The flowers themselves are small, inconspicuous, and usually arranged in a loose raceme. Bracted orchid is a North American variant of *H. viridis*, from Eurasia. The British Columbia plants are very variable, especially those from northern British Columbia, and no doubt there are many intermediates between the typical form and its variety *bracteata*.

LISTERA R. BR. (TWAYBLADE)

The twayblades are small, inconspicuous, delicate orchids named in honour of an English naturalist, Martin Lister (1638–1712). Twayblades have fleshy fibrous roots, slender stems, often glandular-pubescent above; leaves in a single pair, opposite or subopposite, sessile, located near the middle of the stem. Their inflorescence is a narrow terminal raceme of small greenish-purple flowers without a spur. The petals and sepals are much alike or nearly so, separated, spreading, or reflex. The lip is longer than the sepals and petals, declined or projecting horizontally, 2-lobed or 2-cleft.

This is rather a small genus of not more than twenty-five species which thrive best in a cool climate and are distributed in boreal and temperate regions of the Northern Hemisphere. Four species are credited to British Columbia.

Twayblades were studied intensively by Darwin, who was interested in the manner in which these orchids are fertilized by insects.

A. Lip deeply cleft into linear acute lobes ..... *L. cordata*

AA. Lip entire or shallowly cleft into obtuse lobes.

B. Lip rectangular or oblong, broad and auriculated at the base, provided with a pair of lateral teeth ..... *L. borealis*

BB. Lip wedge-shaped, provided with a pair of lateral teeth but not auriculated at the base.

Ovary glabrous; lip sessile, not ciliate in the margin, with a slender tooth on each side at the base ..... *L. caurina*

Ovary glandular; lip shallowly notched at the apex, ciliate in the margin, with a triangular tooth on each side at the base ..... *L. convallarioides*

Listera borealis Morong. Northern Twayblade

SYNONYM.—*Ophrys borealis* (Morong.) Rydb.

OTHER COMMON NAMES.—Narrow leaves, big ears.

DESCRIPTION.—*Stem:* Rather small, up to 25 cm. high, 4-sided, smooth, greenish-white. *Leaves:* Ovate or lanceolate, obtuse at the apex, glabrous, 2–6 cm. long, inserted above the middle of the stem. *Raceme:* Loose, few-flowered; perianth parts all strongly reflexed. *Flowers:* Pale green or yellowish-green. *Sepals:* Pale green with darker mid-vein, lanceolate. *Petals:* Nar-

Northern twayblade (*Listera borealis* Morong.). Plant about half natural size; flower about four times natural size.

rower, lance-linear, wide spreading, three-fourths length of lip, 1-nerved. *Lip:* Pale translucent green with the nerves purplish, shallowly 2-cleft with broad auricles at the base, 6–12 mm. long and about 5 mm. wide. *Column:* Moderately curved, 3–4 mm. long. *Capsule:* Ovoid.

HABITAT.—In moist, mossy coniferous forest, in ravines along streams, moist subalpine and alpine slopes, on the forest floor among a deep sponge of lichens and mosses. Mostly at high elevations.

SEASON.—May to July.

RANGE.—Alaska, Yukon, Northwest Territories to Hudson Bay, British Columbia to Alberta, south to Colorado, Montana, Idaho, and Utah.

DISTRIBUTION IN BRITISH COLUMBIA.—Quite rare and widely scattered. Collected in Southwest and Southeast Interior and also in Northern Interior. Very rare in the Northeast, not collected on the Coast.

COMMENTS.—The specific name *borealis* (northern) refers to the region where this species was discovered and where it occurs

most frequently. Northern Twayblade was first reported from Alaska by Morton. This species is extremely close to the eastern *L. auriculata* Wiegand, which usually has broader and thinner leaves and a much narrower lip. Collections indicate that it occurs with us infrequently and widely scattered, and so it is difficult to give any idea of the pattern of its distribution. This limitation may be on account of its highly specified ecological requirements of exceptionally cool soil with a preference for high acidity. Sphagnum peat bog and cool mossy coniferous forest seem to be ideal habitats for this twayblade.

***Listera caurina* Piper. Northwest Twayblade**

SYNONYMS.—*Ophrys caurina* (Piper) Rydb.; *Listera escholtziana* Ledeb.

DESCRIPTION.—*Stem:* Slender, up to 30 cm. high, densely glandular-puberulent above the leaves. *Leaves:* 2, nearly opposite, sessile by a clasping base, ovate or acutish, glabrous, 3–6 cm. long. *Raceme:* 5- to many-flowered, open, up to 15 cm. long;

Northwest twayblade (*Listera caurina* Piper). Plant half natural size; flower, front view, about twice natural size.

floral bracts glabrous to slightly glandular, up to 1 cm. long. *Flowers:* Greenish or yellowish, small on filiform, glandular pedicels. *Sepals* and *Petals:* Lanceolate, spreading, not reflexed in anthesis. *Lip:* About 5 mm. long, entire, rounded to retuse at the apex and a small tooth on each side near the base. *Capsule:* Ovoid, glabrous, not longer than 5–6 mm.

HABITAT.—Damp, shaded coniferous forests; moist, shady, cool places on wooded mountain-slopes.

SEASON.—June to August.

RANGE.—Alaska, British Columbia to Alberta, south to California, Idaho, and Montana.

DISTRIBUTION IN BRITISH COLUMBIA.—Coastal, with only a few scattered localities in the Southeast Interior. A poorly collected species which in the future should have many new records.

COMMENTS.—The species name *caurina,* signifying "of the northwest wind," is in allusion to the Northwest, where this species occurs. Northwest twayblade is often confused with *L. convallarioides,* which it resembles to some extent, but differs in its more slender growth, smaller flowers, and glabrous ovary. Its most distinguishing character is the lip, which is entire or merely retuse at the apex, and provided with long narrow basal teeth. Other species occurring in British Columbia have their lip cleft at the apex.

***Listera convallarioides* (Sw.) Nutt. Broad-leaved Twayblade**

SYNONYMS.—*Epipactis convallarioides* Sw.; *Ophrys convallarioides* (Sw.) W. F. Wight.

OTHER COMMON NAMES.—Broad-lipped twayblade, wedge-lip, scutcheon twayblade.

DESCRIPTION.—*Stem:* Relatively stout, stoloniferous, glabrous below, glandular-pubescent above, up to 35 cm. tall. *Leaves:* 2, opposite (sometimes alternate), smooth, round-oval, acute to acuminate, 3–6 cm. long and 2–5 cm. wide. *Raceme:* Short-peduncled, loosely many-flowered, up to 12 cm. long with glandular small bracts. *Flowers:* Yellowish-green with strongly reflexed perianth parts and cuneate lip about 1 cm. long. *Sepals:* Oblong-lanceolate. *Petals:* Similar. *Lip:* Translucent, with a short slender claw below, abruptly widened by a pair of triangular teeth, and

Broad-leaved twayblade (*Listera convallarioides* (Sw.) Nutt.). Plant about half natural size; flower, front view, about twice natural size.

further dilated at apex into a pair of lobes separated by a notch with a very small median tooth, 8–12 mm. long. *Column:* Slender, about 3 mm. long. *Capsule:* 5–6 mm. long, glabrous or nearly so.

HABITAT.—Rich moist leaf-mould, in damp mossy coniferous or mixed forests, bogs, meadows, and various types of wet habitats.

SEASON.—June to August.

RANGE.—Alaska, British Columbia to Newfoundland; south to California and east in Idaho, Nevada, Arizona, Utah, Wyoming, and Colorado; in the east, south to New York, Michigan, mountains of Carolina and Tennessee. Also in Asia.

DISTRIBUTION IN BRITISH COLUMBIA.—Limited to the southern part of the Coast and Southern Interior, where it is locally quite abundant. Occasionally in Southwest Interior.

COMMENTS.—The species is named *convallarioides* because of the resemblance of its two leaves to those of the lily-of-the-valley (*Convallaria majalis*). This species was often confused with *Listera caurina* before it was clearly defined. Undoubtedly it is poorly represented in collections and should be found in other parts of British Columbia in suitable habitat, which is rich humus in open coniferous forest.

Listera cordata (L.) R. Br. Heart-leaved Twayblade

SYNONYMS.—*Ophrys cordata* L.; *O. nephrophylla* Rydb.; *Listera nephrophylla* Rydb.

OTHER COMMON NAMES.—Heart-leaves, mannikin twayblade.

DESCRIPTION.—*Stem:* 10–25 cm. tall, slender, erect, glabrous throughout except for a small glandular-pubescent area just above the leaves, from a very slender creeping rhizome with a few white filiform roots. *Leaves:* A pair, at middle of stem, opposite, round-ovate, somewhat heart-shaped, 1–4 cm. long, shining above, paler beneath. *Raceme:* 2–10 cm. long, few-flowered, sometimes crowded. *Flowers:* Minute, yellowish-green to purplish with wide-spread perianth parts. *Sepals:* Pale green, ovate-oblong to elliptic, 2–3 mm. long. *Petals:* Purplish-green, ovate-lanceolate, 1.5–2.5 mm. long. *Lip:* Purplish-green to reddish-brown, linear-oblong, 3–5 mm. long, deeply divided into two narrowly spreading lobes, and armed at the base with a pair of horn-like teeth. *Column:* Minute, about 0.5 mm. long. *Capsule:* Ovoid up to 5 mm. long.

HABITAT.—Mossy bogs, often in sphagnum; in mossy damp coniferous forests and thickets, usually in mountainous regions, frequently submerged in moss up to its pair of heart-shaped leaves.

SEASON.—May to July, depending on its location.

RANGE.—Alaska, British Columbia to Newfoundland; south to California and inland to New Mexico and Montana with the exception of Arizona and Nevada; in the east in the mountains, through northern New England to North Carolina and inland in Michigan. Also Greenland, Iceland, and Eurasia.

DISTRIBUTION IN BRITISH COLUMBIA.—Widely spread and locally quite common throughout the Province.

COMMENTS.—The name *cordata* (heart-shaped) refers to the shape of the leaves. The plant is to be expected in suitable habitats throughout British Columbia, and is probably much more common than the rather limited number of records indicate. This variable species is found in one or other of its two colour forms. One has greenish-yellow flowers (var. *nephrophylla* (Rydb.) Hult.), while the other, the typical form, has dark-purple flowers. Of the above, var. *nephrophylla* occurs mainly in the Northern Interior

Heart-leaved twayblade (*Listera cordata* (L.) R. Br.). Plant about natural size; flower, front view, about twice natural size.

and occasionally in the Central Interior. It is quite possible that it represents a geographical variety. The typical form is most common and very abundant on the southeast coast of Vancouver Island and in the Southwest Interior. It is interesting to note that these two forms often grow together, but I have never noticed any intergrades among them. Though it has no special beauty, it is of interest because of its minute complicated mechanism for pollination. Heart-leaved twayblade is the most familiar of all the twayblades in Europe, as well as in the North American Continent.

EPIPACTIS Sw. (HELLEBORINE)

The name *Epipactis* was used by Theophrastus for the hellebore, which belongs to the buttercup family. This is a small genus of the north temperate zones of Europe and Asia, with two species in North America. They are perennial plants, arising from a short rhizome with a cluster of thickened roots. The erect leafy stem has a few- to many-bracted flowers in a raceme. The flowers are small or medium-sized, usually greenish to purplish, with a charac-

teristic sessile lip on the base of the column, and constricted or distinctly 3-lobed above.

Lip distinctly 3-lobed; lateral lobes forming a gibbous sac; flowers showy, in a flat raceme ..... *E. gigantea*
Lip not 3-lobed, somewhat constricted about the middle; flowers small in dense raceme ..... *E. helleborine*

Epipactis gigantea Dougl. ex Hook. Giant Helleborine

SYNONYMS.—*Peramium giganteum* (Dougl. ex Hook.) Coulter; *Serapias gigantea* (Dougl. ex Hook.) A. A. Eaton; *Helleborine gigantea* (Dougl. ex Hook.) Druce.

OTHER COMMON NAMES.—Giant orchid, false lady's-slipper.

DESCRIPTION.—*Plant:* Erect, sparsely pubescent, up to 1 m. or more high. *Stem:* Stout, leafy, often tinged with purple at the base. *Leaves:* Lower ovate, the upper lanceolate, acute, clasping the stem or with a short tubular petiole, up to 20 cm. long and 7 cm. wide. *Raceme:* 2–15-flowered, lax, elongated, usually glabrous or minutely pubescent; floral bracts, foliaceous, lanceolate, exceeding the flowers, the lower one quite large, gradually reduced and becoming bracts at the top. *Flowers:* Greenish or purplish, showy with pedicellate, puberulent ovaries, up to 15 mm. long. *Sepals:* Greenish to reddish, about 15 mm. long, the upper concave, the lateral spreading and acute. *Petals:* Purple-veined, ovate to ovate-lanceolate, obtuse to acute, about 15 mm. long. *Lip:* Sessile on the base of the column, unequally 3-lobed, strongly veined and marked with red or purple, about 10 mm. long and 6 mm. wide. *Column:* Short, erect, with lateral horns. *Capsule:* Ellipsoid, pendent, about 20 mm. long.

HABITAT. — Moist shady places along rivers and streams, swamps, marshy places, wet meadows, and seepage slopes.

SEASON.—June to August.

RANGE.—British Columbia, south to Mexico and inland to Texas and South Dakota.

DISTRIBUTION IN BRITISH COLUMBIA.—This attractive species apparently is rare in the Province. It is known only from a few localities—Cultus Lake on the Coast, Fairmont Hot Springs, Koo-

Giant helleborine (*Epipactis gigantea* Dougl. ex Hook.).
Plant about half natural size.

tenay Lake near Boswell in the Kootenay District, Howser Lake in the Selkirks, and Enderby in the Southeast Interior.

COMMENTS.—The specific name *gigantea* refers to the large size of the plant. The flowers of the giant helleborine are rather showy and are arranged in a lax raceme. This orchid, which occurs only in the West in the American Continent, is most abundant around hot springs in British Columbia. It is interesting to note that it occurs outside the Province in the vicinity of salt springs and alkaline meadows. Giant helleborine has been cultivated and has proved to be quite hardy.

Epipactis helleborine (L.) Crantz. Helleborine

SYNONYMS.—*Serapias helleborine* L.; *S. latifolia* (L.) Huds.; *Epipactis latifolia* (L.) All.

OTHER COMMON NAME.—Broad-leaved helleborine.

DESCRIPTION.—*Plant:* Erect, up to 1 m. high. *Stem:* Glabrous below, puberulent above, leafy. *Leaves:* Clasping stem, variable, ovate to lanceolate, acute, reduced above and finally becoming floral bracts, up to 15 cm. long. *Raceme:* Few- to

Helleborine (*Epipactis helleborine* (L.) Crantz.).
Plant about half natural size.

many-flowered, loose or somewhat dense, bracteose, up to 30 cm. tall. *Flowers:* Rather small, greenish, tinged with purple, puberulent. *Sepals and Lateral Petals:* Up to 12 mm. long, ovate-lanceolate, acute, green, glabrous, strongly veined with purple. *Lip:* Greenish with purple, dark purple on the lower half, sessile on the base of the column, about 10 mm. long, lower half fleshy, saccate. *Column:* Short, fleshy, about 5 mm. long. *Capsule:* Pendent, ellipsoid, 10 mm. long.

HABITAT.—Waste places, cool, shady, moist woods and thickets, wooded roadsides, gravelly slopes, and occasionally grassy fields and dry woods.

SEASON.—June to September.

RANGE.—British Columbia, Quebec to Pennsylvania, also Wisconsin, Missouri, and Montana.

DISTRIBUTION IN BRITISH COLUMBIA.—Victoria, Vancouver Island.

COMMENTS.—The specific name *helleborine* apparently alludes to its resemblance to the hellebore, which belongs to the buttercup family. This European weedy orchid was first discovered in Amer-

ica in 1879. Since that time the helleborine has spread rapidly in the Eastern States and Canada with the aggressiveness of a weed, especially in fertile ground. British Columbia records of this orchid are known only from Victoria and district, where, no doubt, it was introduced as a garden plant and escaped to surrounding woodlands. Helleborine is characterized by its slender leafy stem and densely many-flowered raceme. The flowers are much smaller than in the preceding species, and are greenish tinged with purple.

It is hard to visualize the orchid as a weed, but this term certainly applies to the helleborine. A number of people who introduced this plant into their gardens in Victoria have reason to regret it. I have seen specimens grown on fertile soil, so robust and abundant that the term "weedy" seems inadequate to describe them.

CEPHALANTHERA L. C. RICH. (CEPHALANTHERA)

The name of this genus, *Cephalanthera*, comes from the Greek and means "head" and "anther" (because of the position of the anther in relation to the column).

Saprophytic or non-saprophytic terrestrial plants arising from branched, creeping rhizomes with leaves normal or reduced to scarious sheaths. The subsessile flowers are subtended by scarious bracts and arranged in a loose, few-flowered raceme. The lip is sessile, with a gibbous-saccate base, 3-lobed above the middle.

It is a rather small genus of about a dozen species found in temperate and boreal zones in North America, Eurasia, and Africa.

In North America it is represented by only one species, *C. austinæ* (phantom orchid), which is unique in the genus since it is a saprophytic plant. In British Columbia the phantom orchid is localized in one small area (*see* distribution map); it is considered not only one of the most interesting orchids, but also one of the rarest.

Cephalanthera austinæ (A. Gray) Heller. Phantom Orchid

SYNONYMS.—*Chlorœa austinæ* A. Gray; *Eburophyton austinæ* (A. Gray) Heller; *Serapias austinæ* (A. Gray) A. A. Eaton.

Phantom orchid (*Cephalanthera austinæ* (A. Gray) Heller). Plant about half natural size; flower, side view, about twice natural size.

OTHER COMMON NAME.—Snow orchid.

DESCRIPTION.—*Plant:* Saprophytic, erect, glabrous, white throughout, from rhizome producing fibrous thick roots, up to 50 cm. tall. *Stem:* Rather stout, clothed with few scarious sheaths below. *Leaves:* Reduced to scarious, linear-lanceolate bracts. *Raceme:* Rather loose, few- to many-flowered, with small floral bracts. *Flowers:* White, fleshy, subsessile. *Sepals and Petals:* Elliptic-lanceolate, 1–2 cm. long. *Lip:* Sessile, saccate at the base with a broad wing-like margin, about 10 mm. long. *Column:* Semiterete, about 8 mm. long. *Capsule:* Erect, about 1–1.5 cm. long.

HABITAT.—Moist, dense coniferous forest, forested mountain-slopes.

SEASON.—June to August.

RANGE.—British Columbia, south to California, Idaho.

DISTRIBUTION IN BRITISH COLUMBIA.—Extremely rare in the Province and known only from one small area on the Coast, with a very limited number of localities. First collected by H. H. Ross (1926) at Agassiz, then by F. Perry (1928) near Cultus Lake

(Chilliwack district). Re-collected by A. B. Morkill (1943) near Chilliwack, growing singly in a few places in woodlands.

COMMENTS.—The specific name, *austinæ* is in honour of an American plant collector R. M. Austin (1823–1919). The whole plant is a pure waxy white in colour, except that within the throat of each flower there is a lovely spot of golden yellow. As its manner of growth and appearance indicate, it is a saprophyte, and its leaves, reduced to sheathing scales, are entirely lacking in chlorophyll. The flowers are delicately and exquisitely scented. The phantom orchid is endemic to the west of the North American Continent.

SPIRANTHES L. C. RICH. (LADIES' TRESSES)

Ladies' tresses are rather stiff, upright, low-growing orchids, whose scientific name refers to the typically spiralled arrangement of the flowers in the spicate inflorescence of many species in this genus. The scientific name is well chosen, though it is rather difficult to imagine the derivation of the common name.

The stem bears rather long, dense, whorled spikes of small white flowers. The flowers have no spurs, and the tongue-shaped lip has a tubercle on each side of its base. This genus was studied by Darwin, who discovered the remarkable mechanism by which ladies' tresses assure cross-pollination.

This is a polymorphic genus of about 300 species which are widely distributed throughout the temperate zone of both hemispheres. Twenty-five species and their varieties are found in North America, the majority of which occur in the eastern part of the continent. Only one representative of this large genus is to be found in British Columbia.

***Spiranthes romanzoffiana* Cham. Hooded Ladies' Tresses**

SYNONYMS.—*Gyrostachys romanzoffiana* (Cham.) McM.; *Ibidium romanzoffianum* (Cham.) House; *Spiranthes stricta* (House) A. Nelson.

OTHER COMMON NAME.—Romanozoff's ladies' tresses.

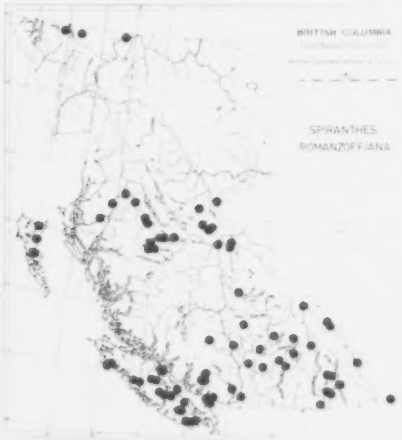
Hooded ladies' tresses (*Spiranthes romanzoffiana* Cham.). Plant about half natural size; flower, side view, about twice natural size.

DESCRIPTION.—*Plant:* Erect, glabrous, often glandular-pubescent in upper part, up to 50 cm. high; roots, fleshy thickish, long, tuberous; basal leaves, linear to linear-lanceolate. *Stem:* Leafy in its lower part, and bracted above. *Flowers:* In a dense, bracteose cylindrical spike, composed of three spiral ranks of creamy-white to straw-coloured flowers, up to 12 cm. long. *Sepals and Petals:* Ovate-lanceolate, up to 12 mm. long, converging and forming a hood over the column. *Lip:* Ovate in outline, up to 12 mm. long, prominently veined, strongly decurved, constricted above the middle and then widened into a terminal round-ovate lobe. Column: 2–3 mm. long.

HABITAT.—Wooded and open bogs, marshes, moist grassy depressions, meadows, along gravelly shores, sandy beaches, and occasionally on dry open hillsides and dry woods.

SEASON.—July to September.

RANGE.—All the way across Canada and northwards to the Arctic Circle; south to California and inland in Nevada, Arizona, Colorado, Nebraska, and South Dakota; in the east, through New England to New York and inland in Michigan and Iowa. Also Ireland.



DISTRIBUTION IN BRITISH COLUMBIA.—Widely spread and common throughout the Province, particularly on Vancouver Island and in the Central Interior. Very rare in the Northeast.

COMMENTS.—This species was named for a Russian Minister of State and patron of science, Nicholas Romanzoff (1754–1826).

It is rather a common orchid in our Province, growing in a great variety of habitats. The species is very easy to distinguish because of its characteristic hood and the spiral arrangement of the flowers.

GOODYERA R. BR. (RATTLESNAKE PLANTAIN)

The name of this genus, *Goodyera*, is in honour of John Goodyer (1592–1664), an English botanist. Orchids belonging to this group are commonly known as "rattlesnake plantains," as the silvery-white markings on the rosettes of velvety evergreen leaves resemble those on a snake. Indians once thought that these plants had some curative property for rattlesnake bite.

The characteristics of this genus are the presence of evergreen variegated leaves in most species and the presence of a hood formed from petals and dorsal sepal and a spurless lip which is curled into a sac with its edges turned outwards. About twenty-five species exist throughout the world, in boreal, temperate, and tropical regions. There are two species of the genus in British Columbia.

Since they are evergreen, ornamental, and thrive well indoors, some of the species are widely used in terraria and other indoor cultivation.

Plants large, usually more than 20 cm. tall; leaves 4—10 cm. long; lip and petals more than 4.5 mm. long ..... *G. oblongifolia*

Plants small, usually less than 15 cm. tall; leaves up to 4 cm. long; lip and petals less than 4 mm. long ..... *G. repens*

Goodyera oblongifolia Raf.

Green-leaved Rattlesnake Orchid

SYNONYMS.—*Goodyera menziesii* Lindl.; *G. decipiens* (Hook.) Hubbard; *Epipactis decipiens* (Hook.) Ames.; *Peramium decipiens* (Hook.) Piper; *P. menziesii* (Lindl.) Morong.

Western rattlesnake (*Goodyera oblongifolia* Raf.).
Plant about half natural size.

OTHER COMMON NAMES. — Menzies' rattlesnake plantain, western rattlesnake.

DESCRIPTION.—*Stem:* Scapose, erect, rather stout and stiff, glandular pubescent, up to 40 cm. high with fleshy creeping rootstalk, provided with thick fibrous roots. *Leaves:* In basal rosette, ovate-lanceolate to narrowly elliptic, up to 8 cm. long, green above, often with broad white midrib and several reticulating white veins. *Raceme:* One-sided, rather lax, in anthesis, up to 10 cm. long. *Floral Bracts:* Lanceolate, up to 12 mm. long. *Flowers:* Small, white, globose; perianth segments about 5 mm. long, glandular-pubescent; petals converging with the dorsal sepal and forming a hood over the lip. *Lip:* Strongly saccate, with a long narrow recurved or spreading apex and a swollen base, about 5 mm. long. *Column:* Prolongated above the stigma with a beak, about 2 mm. long.

HABITAT.—On rich humus among mosses in moist or dry forests.

SEASON.—June to September.

RANGE.—Alaska, British Columbia to Nova Scotia, south to California and inland to New Mexico and Montana; in the east, Maine, Michigan, Wisconsin. Also Mexico.

DISTRIBUTION IN BRITISH COLUMBIA.—Very common on Vancouver Island, Queen Charlotte Islands, Southeast and Southwest Interior. Rather rare in the Northeast, occurring only in the southern region of this sector. Variety *reticulata* is essentially Coastal in its distribution.

COMMENTS.—The species' name *oblongifolia* signifies "oblong-leaved." Green-leaved rattlesnake orchid is still called *Goodyera decipiens* or *Peramium decipiens* by many botanists, but Fernald, in 1946, proved that Rafinesque's earlier name is correct for this species.

A form which has reticulated leaves veined with white, especially prominent along the mid-nerve, has been described as var. *reticulata* Boivin. This reticulation is caused by the lack of chlorophyll in the tissue bordering the veins. Unfortunately, the colour of the reticulation often cannot be judged from dry specimens, due to the fact that as the leaves fade the reticulation disappears. In its distribution, var. *reticulata* is more Coastal than the species. Intergrades between it and the typical form have been collected. This orchid multiplies vegetatively and spreads rapidly; it is very abundant in many places.

Goodyera repens (L.) R. Br.

Northern Rattlesnake Plantain

SYNONYMS.—*Satyrium repens* L.; *Peramium repens* (L.) Salisb.; *Epipactis repens* (L.) Crantz.

OTHER COMMON NAMES.—Creeping goodyera, dwarf rattlesnake plantain.

DESCRIPTION.—*Stem:* Scapose, erect, glandular pubescent above, slightly creeping, up to 30 cm. tall, with slender stolons. *Leaves:* Several, in a basal rosette, ovate to oblong-lanceolate, dark green, with darker veins, up to 4 cm. long. *Raceme:* One-sided, rather lax, up to 8 cm. long in anthesis. *Floral Bracts:* Lanceolate, acuminate; perianth up to 4 mm. long, white, tinged with green or

Northern rattlesnake plantain (*Goodyera repens* (L.) R. Br.). Plant about half natural size; flower about four times natural size.

brown. *Petals:* Converging with the dorsal sepal, forming a hood over the lip. *Lip:* Strongly deeply saccate with recurved tip. *Column:* Up to 1.5 mm. long.

HABITAT.—Damp, mossy forests. It also occurs in dry woods in cooler forests of North America.

SEASON.—July, August.

RANGE.—Alaska, Yukon, British Columbia to Saskatchewan. Rare in Ontario, New Mexico, Arizona, and South Dakota. Also in Eurasia.

DISTRIBUTION IN BRITISH COLUMBIA.—Limited to Southeast Interior and Central Interior, where it occurs most commonly. Rare in Northern Interior. Not reported from the Coast, Vancouver Island, or Queen Charlotte Islands.

COMMENTS.—The species' name *repens* signifies "creeping," in reference to the manner in which the rhizome grows. Northern rattlesnake plantain is a much smaller plant than the green-leaved one; the distinguishing characters lie in the leaves, which are evergreen, smaller, ovate to oblong-lanceolate, and dark green in colour.

A form with the veins of the leaves bordered with white, instead of being dark uniformly, has been distinguished as var. *ophioides* Fernald. This variety grows usually on higher elevation and is less common than the typical form here.

MALAXIS SOLAND (ADDER'S MOUTH)

The generic name *Malaxis* is a Greek word meaning "softening," and probably refers to the texture of the leaves.

The most characteristic feature of this genus is the stem, which arises from a swollen base, a feature found in no other genus of orchids. The sepals are strap-shaped, while the petals are narrow and thread-like.

Malaxis is a rather large genus, consisting of about 250 species, most widely distributed in the Western Hemisphere but rare in Europe. Nine species are found in North America, two of them in British Columbia. All North American species are considered rare, and their distribution is limited to a few isolated places. Being very inconspicuous and growing in relatively inaccessible swamp lands they are easily overlooked, and, so, poorly collected.

Leaf solitary; lip distinctly 3-lobed, narrowly pointed
M. monophyllos var. *brachypoda*
Leaves, 2 to 5; lip not 3-lobed, ovate . *M. paludosa*

***Malaxis monophyllos* var. *brachypoda* (A. Gray) Morris & Eames** — **White Malaxis**

SYNONYMS. — *Microstylis brachypoda* A. Gray; *Malaxis brachypoda* (A. Gray) Fernald.

OTHER COMMON NAMES. — White adder's-mouth, narrow adder's-mouth, pale-leaf, tenderwort.

DESCRIPTION.—*Stem:* Glabrous, pale green, up to 30–35 cm., produced from a corm (bulb-like structure). *Leaf:* 1 (rarely 2), with long sheathing petiole; the blade broadly ovate, rounded to narrowly acute at the apex, 2–8 cm. long and up to 5 cm. wide; second leaf, if present, may vary from scale-like to nearly as large as the main leaf. *Raceme:* Narrowly cylindrical, loosely many-flowered, up to 20 cm. long. *Floral Bracts:* Subulate to lanceolate,

White malaxis (*Malaxis monophyllos* var. *brachypoda* (A. Gray) Morris & Eames). Plant about half natural size; flower, two times natural size.

up to 3 mm. long. *Flowers:* Minute, pale greenish-white or yellowish-green. *Sepals:* Ovate or ovate-lanceolate, the median erect, the lower deflexed, behind the lip. *Petals:* Linear, acute, strongly reflexed, 1–2.5 mm. long. *Lip:* Greenish-white, deflexed, broadly cordate, 2–3 mm. long, tapering to a long point. *Column:* Short, fleshy. *Capsule:* Ovoid, up to 5 mm. long.

HABITAT.—Shady places, along mountain streams, crevices of wet shaded cliffs, damp cool woods, bogs and muskegs.

SEASON.—June to August.

RANGE.—Alaska, British Columbia, Manitoba to Newfoundland, south in California; in the east, through New England to New York, Pennsylvania, and New Jersey and west through the Lake States to Minnesota. Also in Japan.

DISTRIBUTION IN BRITISH COLUMBIA.—Very rare and limited to the Coastal region only.

COMMENTS.—The specific name *monophyllos* is a Greek term meaning "single-leafed" in reference to the characteristic solitary leaf. The variety name *brachypoda* is also a Greek term signifying "short-pedicelled," referring to the practically sessile flower, mak-

ing the spike appear very slender. Variety *brachypoda* differs from its typical form in having the lip in the lowermost position, smaller capsules, and shorter pedicels. The two latter characters are variable and secondary.

White malaxis was first collected in British Columbia by W. Taylor (1937) at the head of Bute Inlet on mud-flats at tidewater; apparently it was quite plentiful. V. Krajina, R. H. Spilsbury, and A. F. Szczawinski collected it in 1950 on Vancouver Island (Nanaimo River valley), while T. M. C. Taylor and W. H. Lewis found it at Salvus in Prince Rupert area in 1952. More recently it was reported by J. A. Calder (1957) from the Prince Rupert area (Skeena River).

Malaxis paludosa (L.) Sw. Marsh Malaxis

SYNONYMS.—*Ophrys paludosa* L.

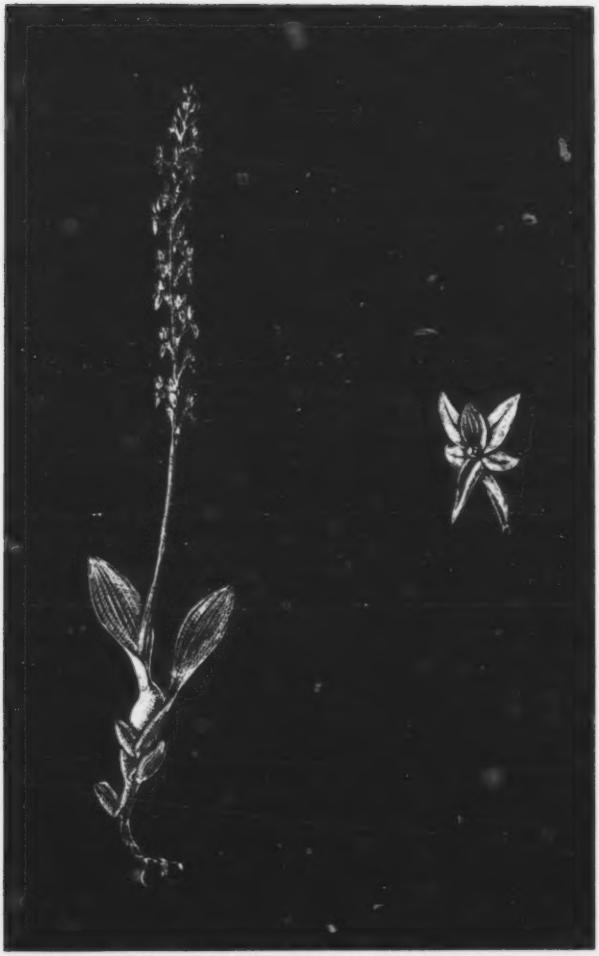
OTHER COMMON NAMES.—Bog tenderwort, bog adder's-mouth.

DESCRIPTION.—*Plant:* Stoloniferous, glabrous, up to 20 cm. tall, produced from small globose-pseudo-bulb (corm) buried in peat or moss; the old corm usually persisting and the daughter bulb enclosed by leaves. *Stem:* Slender, angled above. *Leaves:* 2–5 in a cluster, rounded at the apex and broadly sheathing at the base, fleshy, pale green, up to 30 mm. long. *Raceme:* Up to 10 cm. long, spike-like, becoming lax. *Flowers:* Yellowish-green with small floral bracts closely appressed to the pedicels. *Sepals:* Ovate or ovate-lanceolate, 2–2.5 mm. long, the median erect, the lower deflexed behind the lip. *Petals:* Oblanceolate, up to 1.5 mm. long, spreading horizontally. *Lip:* Greenish-white, deflexed, broadly cordate, often dilated at the base, about 2 mm. long, tapering to a long point, minutely erose. *Column:* Minute, about 0.3 mm. long. *Capsule:* Obliquely ovoid, up to 4 mm. long.

HABITAT.—Usually in wet sphagnum, turfy bogs and muskegs.

RANGE.—Alaska, British Columbia; in the east, in Minnesota and Ontario. Also Eurasia.

DISTRIBUTION IN BRITISH COLUMBIA.—Extremely rare, and known only from a few localities indicated on the distribution map.



Marsh malaxis (*Malaxis paludosa* (L.) Sw.). Plant two-thirds natural size; flower, front view, about three times natural size.

COMMENTS.—The most common habitat for marsh malaxis is wet sphagnum bogs and muskegs, thus making this plant rather unobtainable. It was first collected in British Columbia by B. G. Griffiths (1930) at Aleza Lake, and in the same area by Kujala and Cajander (1931). In 1957 J. A. Calder, D. B. O. Saville, and R. L. Taylor found it in the Prince Rupert area and Queen Charlotte Islands, where it is locally quite abundant.

Outside British Columbia, known only from a few widely separated localities—Alaska (Juneau, Ketchikan, and Wrangell), Ontario (Thunder Bay district), Minnesota (Otter Trail Country). Also Eurasia.

The marsh malaxis has been designated by some botanists as the only European "epiphytic orchid" because of its tendency to grow upon sphagnum and other bog plants. It was discovered in North America for the first time by H. L. Lyon (1905), in northern Minnesota. Since then it has been collected on this continent only a few times and is considered to be one of our rarest orchids.

Its seeming abundance in a peat-bog habitat in the Queen Charlotte Islands is interesting and noteworthy. The question

therefore arises as to whether it has been overlooked elsewhere on account of its inaccessibility and inconspicuousness, since it is very small and embedded in sphagnum-moss. It is not improbable that marsh malaxis occurs in many other localities as yet unknown.

CALYPSO SALISB. (CALYPSO)

Calypso is named after Homer's nymph of Ogygia, the island where Ulysses was wrecked.

A low, scapose, terrestrial plant arising from a solid corm with fleshy roots and often coralloid rhizome. The solitary (rarely two) pinkish-lavender flower is subtended by a linear bract and has similar narrowly lanceolate sepals and petals. The large lip is saccate, shoe-shaped, with the distal portion covered by a delicate translucent apron.

Monotypic genus found in boreal and temperate regions of North America and Eurasia.

Calypso bulbosa (L.) Oakes. Calypso

SYNONYMS. — *Cypripedium bulbosum* L.; *Calypso borealis* (Sw.) Salisb.; *Cytherea bulbosa* (L.) House; *Calypso occidentalis* (Holz.) Heller.

OTHER COMMON NAMES.—Cytherea, fairy slipper, pink slipper-orchid, hider-of-the-north, false lady's-slipper.

DESCRIPTION.—*Stem:* A delicate scape, yellowish-purple to brownish-purple, smooth with membranaceous sheathing bracts, 10–25 cm. high; produced early in second season from an ovoid or globular fleshy pseudo-bulb (corm). *Leaf:* Dark green, solitary, long-petioled, round-ovate, acutish, cordate, or subcordate at the base, 3–5 cm. long, 2–5 cm. wide, strongly ribbed and corrugated, produced late in the season and wintering through. *Flowers:* Solitary, rose-purple (occasionally white), large and showy, pendant. *Sepals:* Purplish, linear-lanceolate, erect, or spreading, 1–2 cm. long. *Petals:* Similar to the sepals and alternating with them. *Lip:* 10–25 mm. long, whitish or yellowish, spotted with purple, pendant, saccate, shoe-shaped, declined, narrowed to the short-bifid summit, the distal portion covered by a delicate translucent whitish

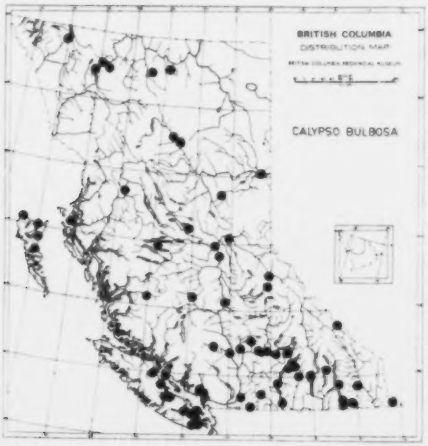
Calypso (*Calypso bulbosa* (L.) Oakes). Plants about natural size.

apron; apron bearded at its base. *Column:* Oval, convex, overhanging the lip. *Capsule:* Erect, up to 3 cm. long.

HABITAT.—Cool, moist coniferous forests and in damp spruce-aspen forests. It also occurs in mossy woods, swamps and bogs.

SEASON.—April (Vancouver Island) to July (northern British Columbia).

RANGE.—Alaska to Labrador; south to California, Arizona, Michigan, and Maine. Also Eurasia.



DISTRIBUTION IN BRITISH COLUMBIA.—One of our commonest and most widespread orchids. Often occurs in numbers sufficient to form a striking community.

COMMENTS.—When Linnæus found calypso for the first time, in the cool woods of Sweden, he gave it the generic name *Cypripedium* because its shoe-like lip looked much like that of the lady's-slipper. The flower of calypso somewhat resembles that group of pouch-orchids, and by many it is still called lady's-slipper locally. However, taxonomically these two genera are quite different, as the classification is based on the structure of the reproductive or-

gans, and calypso is in the same general group as the twayblades. Interesting white variants (forma *alba*) have been collected on Vancouver Island in the vicinity of Victoria and on the Saanich Peninsula.

This charming little orchid is very fragrant and is easily distinguished by its slipper-like flower, with an overlap forming an apron in front. Calypso is deemed by many who appreciate wild orchids as the most beautiful of them all. It is still one of the most common orchids in British Columbia, but it is being exterminated in places frequented by man. When the flowers are picked, the plant is usually destroyed, as the small corm (bulb-like structure) is on the surface, held there by delicate roots that break at the lightest touch. Calypso is the lone representative of the genus in North America, but it has relatives in Northern Europe, Russia, and Lapland, as well as in the East Indies.

CORALLORHIZA (HALL.) CHAT. (CORAL-ROOT)

The generic name *Corallorhiza* comes from a Greek term and is in allusion to the coral-like rhizome.

The coral-roots have no green colouring (chlorophyll), and consequently do not make their own food. They are true terrestrial saprophytic orchids, living on decaying organic matter. Although they received their name from the coral-like formation of their roots, they have really no roots, but a much-branched underground stem (rhizome). As saprophytic plants, they live in equilibrium with various fungi, making it almost impossible to transplant them.

The stem is yellowish, purplish, or brownish, and the leaves are reduced to membranaceous sheaths. The inflorescence which terminates the naked scape is a lax raceme of small flowers. The character of the lip and the coloration distinguish the species.

This is a small genus of about fifteen species in the north temperate zone, occurring mainly in North and Central America. One species is found in Eurasia and four grow in British Columbia.

A. Sepals and lateral petals with 3 conspicuous purple stripes..... *C. striata*
AA. Sepals and lateral petals not striped.

B. Lateral sepals 1-nerved; lip up to 5 mm. long; plant usually less than 15 cm. tall, yellow or yellowish green ..... *C. trifida*

BB. Lateral sepals 3-nerved; lip 5–10 mm. long; plant usually more than 15 cm. tall, purple or brownish-red (very rarely yellow).

Lip usually reddish-purple, not spotted, scarcely 3-lobed: spur free, at least below the middle and conspicuously exserted ..... *C. mertensiana*

Lip usually white and spotted with purple, deeply 3-lobed; spur inconspicuous or reduced to a gibbous swelling ..... *C. maculata*

Corallorhiza maculata Raf. Spotted Coral-root

SYNONYMS.—*Corallorhiza multiflora* Nutt.

OTHER COMMON NAMES.—Many-flowered coral-root, large coral-root.

DESCRIPTION.—*Stem:* Pinkish-purple, erect, glabrous, rather stout, with several tubular sheaths extending above the middle, up to 50 cm. or higher and deriving from a brownish rhizome. *Raceme:* Few- to many-flowered, up to 20 cm., with minute, translucent floral bracts. *Flowers:* Spreading, on rather stout pedicels. *Sepals and Lateral Petals:* Spotted or suffused with purple, narrow, oblong to oblanceolate, 3-nerved; the lateral sepals divergent. *Lip:* White spotted with purple, unequally 3-lobed, 5–8 mm. long; lateral lobes relatively small, somewhat curved; mid-lobe broadly rounded or obtuse at the apex and deflexed. *Column:* Yellow with purple spots up to 5 mm. long. *Capsule:* Nodding, ovoid, up to 25 mm. long.

HABITAT.—Decaying humus in moist or dry coniferous or mixed forests, occasionally in shaded, grassy or mossy places, along streams in wooded areas.

SEASON.—End of May to August.

RANGE.—British Columbia to Newfoundland, south to California, south through New England to North Carolina, Texas, also Mexico and Guatemala.

DISTRIBUTION IN BRITISH COLUMBIA.—Widely distributed and common on Vancouver Island, Southwest, Southeast, and Central Interior. Rare in the north. Not collected on Queen Charlotte Islands and Haines Cut-off.

Spotted coral-root (*Corallorhiza maculata* Raf.). Plant about half natural size; flower, front and side view, about natural size.

COMMENTS.—The specific name *maculata* is from the Latin meaning "spotted," in reference to the purplish spots on the lip.

C. maculata shows affinities with *C. mertensiana* and intergrades between the two are quite common. However, it is possible to distinguish these two species in the field by the following:—

C. maculata	*C. mertensiana*
Lip usually white and spotted with magenta-crimson; 3-lobed.	Lip usually reddish-purple; entire or slightly 3-lobed.
Mentum (spur-like projection formed by the sepals and extended foot of the column) inconspicuous, and sometimes occurring as a swelling.	Mentum free from the ovary (at least below the middle), with the distal half conspicuously exserted.
Perianth segments not spreading.	Perianth segments widely spreading.
Flowers spreading from the rachis.	Flowers rising somewhat upwards, erect.
Column yellow with magenta spots on the ventral surface, 4–5 mm. long.	Column without magenta spots on the ventral surface, longer than half the length of the sepal, 4–7 mm. long.

In dealing with herbarium material however, it is sometimes difficult to separate these species, as the dividing characters are often variable, and indistinguishable in dry specimens.

Several variants of *C. maculata* have been described, the following of which are to be found in British Columbia:—

var. *occidentalis* (Lindl.) Cockerell, with a gibbous spur-like mentum; occurs only in the West.

var. *flavida* (Peck) Cockerell, with a yellow stem, lemon-yellow flowers and an unspotted white lip; quite scattered in its distribution. Recently collected in several localities on Vancouver Island.

var. *punicea* H. H. Bartlett, with stem and fruit dark purple and sheaths much paler than the stem; more common than the rather limited number of records indicate. Occurs on the Coast, Northern Interior, and Northeast.

Coral-roots as a genus require more critical studies to solve their taxonomy and to arrange a workable key which would lead to a certain degree of accuracy in the determination of their species and varieties, whether in the field or herbarium.

Corallorhiza mertensiana Bongard. Western Coral-root

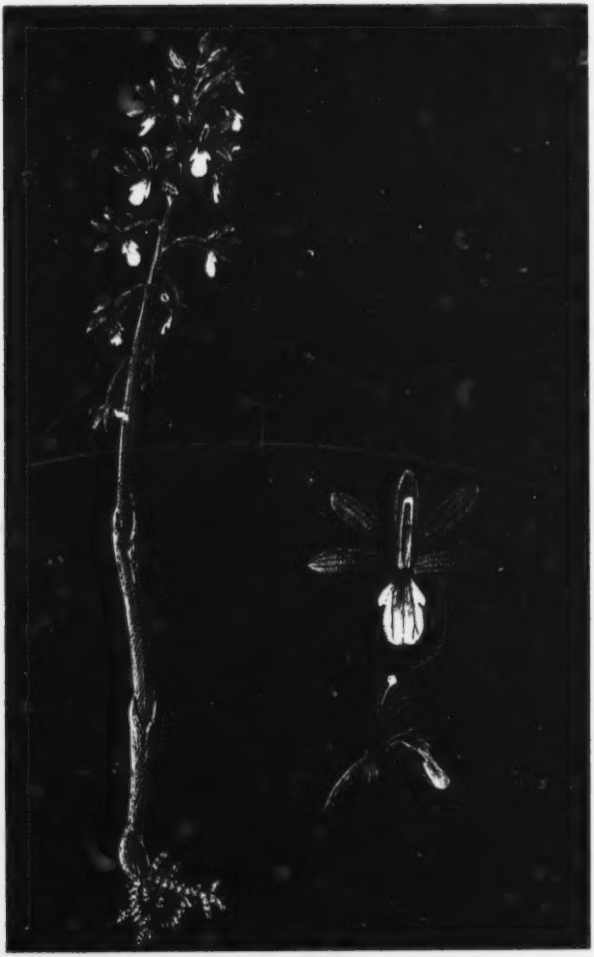
OTHER COMMON NAME.—Mertens' coral-root.

DESCRIPTION.—*Plant:* Erect, glabrous, succulent, without leaves, up to 50 cm. high. *Stem:* Stout, brownish-purple, clothed usually with 3 tubular scarious bracts. *Raceme:* Few- to many-flowered, with minute floral bracts up to 2 mm. long. *Flowers:* Greenish or purplish on slender pedicels, 2–3 mm. long. *Sepals:* Spreading and reflexed, linear, obtuse, 3-nerved. *Petals:* Linear-oblong, obtuse, 3-nerved. *Lip:* Reddish-purple, broadly oblong, narrowed at the base, entire or with a short tooth on each side at or near the base, 3-nerved, up to 9 mm. long. *Column:* Slender, nearly equaling the perianth. *Capsule:* Obovoid, narrowed at the base, about 15 mm. long.

HABITAT.—Rich humus in wet coniferous forest, moist uplands, along shaded stream-banks, and occasionally in grassy or mossy habitat in shady wooded areas.

SEASON.—June to beginning of August.

RANGE.—Alaska to Wyoming and California.



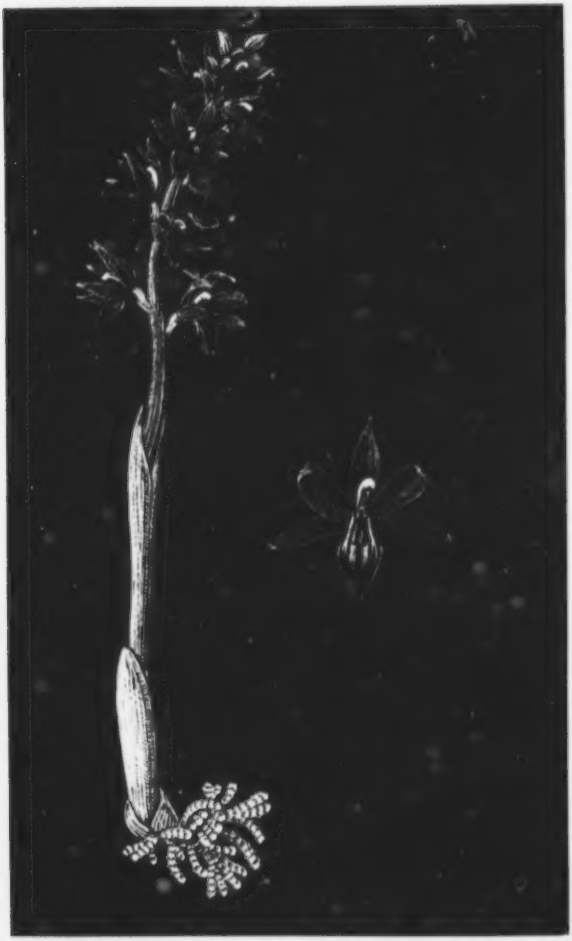
Western coral-root (*Corallorhiza mertensiana* Bongard). Plant half natural size; flower about twice natural size.

DISTRIBUTION IN BRITISH COLUMBIA.—Quite common in the Coastal region and particularly on Vancouver Island. Scattered in Southwest and Southeast Interior. Not collected in the northern part of the Province.

COMMENTS.—The specific name *mertensiana* is after the German botanist Mertens (1764–1831). Western coral-root, according to Correll (1950), is our only distinctly western and northwestern species, and is also more restricted in its range than any of the others. The most significant separating characters are the lip, which is reddish-purple as a rule, and a chin-like projection formed by the sepals and extended foot of the column (mentum) free from the ovary and projected. In addition, the sepals and petals are spreading and reflexed. It grows chiefly in cool coniferous forests, and it is considered to be a cool-climate, acidophilous plant.

Corallorhiza striata Lindl. Striped Coral-root

SYNONYMS.—*Corallorhiza macraei* A. Gray; *C. bigelovii* S. Wats.; *C. vreelandii* Rydb.



Striped coral-root (*Corallorhiza striata* Lindl.). Plant about half natural size; flower, front view, about natural size.

OTHER COMMON NAMES.—Macrae's coral-root, Bigelow's coral-root, madder-stripes.

DESCRIPTION.—*Plant:* Erect, glabrous, without leaves, up to 50 cm. high. *Stem:* Purple or magenta, stout, succulent, with 2–4 acute or cuspidate, yellowish or purple, tubular scarious bracts. *Raceme:* Loose, few- to many-flowered, with minute floral bracts, up to 2 mm. long. *Flowers:* Variable in size, yellowish or whitish, conspicuously striped with red-purple (not spotted). *Sepals and Petals:* Narrowly elliptic, arching forward, rounded to obtuse at the apex, usually 3 but sometimes 5, striped with reddish-purple, up to 15 mm. long. *Lip:* Oval or obovate, declined, striate veined, entire or a little undulate, slightly auriculate at the base and white or purple throughout. *Spur:* None, but petals and sepals gibbous at the base. *Column:* Slender, thickened at the base, up to 5 mm. long. *Capsule:* Ellipsoid, up to 2 cm. long.

HABITAT.—In moist humus, in shady, coniferous forests, shaded ravines, canyons and stream-banks.

SEASON.—April to August.

RANGE.—British Columbia to Quebec, south to California, Lake States, Texas; Mexico.

DISTRIBUTION IN BRITISH COLUMBIA.—Limited to the south-east coast of Vancouver Island, South and Central Interior, and occasionally in the south Coastal area. The south Peace River area seems to be its most northern locality.

COMMENTS.—The specific name *striata* is from the Latin meaning "striped" and alludes to the conspicuous purple lines (stripes) on the perianth parts. Striped coral-root is the most conspicuous and one of the most beautiful of all the coral-roots. Its tall, stout stem, up to 20 inches high, is smooth, leafless, and madder purple or magenta in colour, being sheathed with 3–9 whitish, yellowish, or pale-purple scales. The flowers are arranged in a loose raceme of few to 25 drooping, rather large flowers. The oblong-lanceolate petals and sepals form a loose hood over the column; each sepal is marked by three long purple stripes, while the petals have, in addition to the three full-length stripes, two shorter ones. Striped coral-root is most attractive when it is seen in sunlight. Its large purple-striated flowers and tongue-shaped lip make this species unmistakable.

Corallorhiza trifida Chat. Northern Coral-root

SYNONYMS.—*Corallorhiza innata* R. Br.; *C. ericetorum* Drejer.

OTHER COMMON NAMES.—Early coral-root, pale coral-root.

DESCRIPTION. — *Plant:* Derived from whitish, somewhat branching rhizome. *Stem:* Erect, glabrous, up to 35 cm. tall, greenish to deep yellow, slender with few close sheathing bracts clasping the stem. *Flowers:* Few to many in lax raceme, up to 8 cm. long, with minute triangular, membranaceous bracts. *Sepals and Lateral Petals:* Yellowish-green, lanceolate, 4–5 mm. long, 1-nerved, the lateral sepals extending forward under the lip. *Petals:* Coming into contact with the dorsal sepals and forming a hood over the column; spur, none. *Lip:* White, sometimes spotted with purple, nearly equalling petals, oblong or broadly rounded, bearing two conspicuous lateral lobes below the middle and two short parallel ridges on the face. *Column:* Up to 6 mm. long. *Capsule:* Ellipsoid, pendent about 10 mm. long.

Northern coral-root (*Corallorhiza trifida* Chat.). Plant about half natural size; flower about twice natural size.

HABITAT.—Growing singly or in clusters; mossy wet ground, loose thick humus in coniferous forests, swampy spruce areas, wet mossy meadows, and also along streams and on damp slopes in wet boreal forests.

SEASON.—May to July.

RANGE.—Alaska, British Columbia to Newfoundland, south to Oregon, Utah, Colorado, Ohio; in the east, New England to New Jersey, Georgia. Also Greenland and Eurasia.

DISTRIBUTION IN BRITISH COLUMBIA.—A widely spread species, quite generally distributed throughout the Interior but most common in the south Interior. Not known on the Coast, Vancouver Island, Queen Charlotte Islands, and Haines Cut-off.

COMMENTS.—The species name *trifida* is in allusion to the 3-lobed lip. Northern coral-root is a small, slender, smooth, pale greenish-yellow orchid with brittle rhizome. Northern coral-root may not be as rare as the distribution map indicates, as it is often overlooked and consequently poorly collected. Its abundance was noticed by several collectors in boggy areas in northern British Columbia. It is often called early coral-root, as its blooming sea-

son sometimes begins in March (in Alberta), but it may be as late as August in various parts of its range, depending on its location and elevation. The rather small succulent yellowish stem and the shape of the lip make northern coral-root an easy species to distinguish.

EXCLUDED SPECIES

Liparis loeselii (L.) L. C. Rich., included by J. W. Eastham in his 1947 supplement to the *Flora of Southern British Columbia*, by J. K. Henry, was based on a specimen collected at Eight Mile Creek, Nicola, by G. V. Copley, which was erroneously identified. No other records of this species are known from our Province.

GLOSSARY

Acidity—the condition characterized by the presence of acid substances.
Acuminate—tapering at the end.
Acute—ending in a point.
Androecium—the stamens as a unit of the flower.
Anterior—front; on the front side of a flower or organ.
Anther—the part of a stamen containing the pollen.
Anthesis—the time of expansion of a flower.
Apex—the tip of an organ.
Apical—situated at the apex or tip.
Ascending—growing obliquely upward, or upcurved.
Attenuate—slenderly tapering; becoming very narrow.
Auricle—an ear-shaped appendage.
Auriculate—with a basal lobule; furnished with auricles.
Axil—the upper angle formed by a leaf or branch with the stem.
Bi—a prefix, meaning two or twice.
Bifid—two-cleft.
Bracted (-eate)—having bracts.
Bulbous—having the character of a bulb.
Calceolate—slipper-shaped.
Callose—having a hard protuberance or thickening.
Calyx—the outer of two series of floral leaves.
Capsule—a dry dehiscent fruit composed of more than one carpel.
Cauline—borne on a stem.

Chaparral—a dense, almost impenetrable thicket of shrubs or dwarf trees.
Chlorophyll—green colouring-matter of plants.
Ciliate—fringed with hairs; bearing hairs on the margin.
Circumboreal—in boreal regions around the world.
Clasping—partly or wholly surrounding stem.
Clavate—club-shaped.
Claw—the narrow or stalk-like base of some petals.
Cm. (centimetre)—a measure of length equal to 0.393 inch (2.54 cm.=1 inch); 1 cm.=10 millimetres.
Coherent—having similar parts united.
Column—the organ formed by the union of the stamens and pistils.
Concave—shallowly hollowed; saucer-like.
Connivent—coming into contact; converging.
Constricted—drawn together, contracted.
Convex—having a more or less rounded surface.
Coralloid—coral-like, somewhat brittle; usually much branched.
Cordate—heart-shaped with the point upward.
Corm—the enlarged fleshy base of a stem, bulb-like but solid.
Corolla—the inner of two series of floral leaves; petals considered collectively.
Cuneate—wedge-shaped; triangular, with the acute angle downward; applied to leaf bases and the base of floral segments.
Cuspidate—tipped with a sharp rigid point.
Decumbent—reclining or lying on the ground, but with the growing end or summit erect or ascending.
Deltoid—broadly triangular.
Dentate—toothed, especially with outwardly projecting teeth.
Di—as a prefix in compounds, means two or twice.
Dilated—expanding into a blade, as though flattened.
Disk—in orchids, the face or upper surface of the lip.
Dm. (decimetre)—a measure of length equal to 3.93 inches or 10 centimetres.
Dorsal—back; relating to the back or outer surface of a part of an organ, as the lower side of a leaf; the opposite of ventral.
Ellipsoid—a solid with an elliptic shape.
Endemic—native to a given region, a country or an island.

Entire—without divisions, lobes, or teeth.

Epiphyte—a plant growing on another or on some other elevated support.

Erect—upright, perpendicular to the ground or its attachment.

Erose—as if gnawed; a ragged edge.

Exserted—projecting beyond a common point.

Falcate—sickle-shaped.

Family (of plant)—a group of related genera.

Fibrous (root)—composed of or resembling fibres; the texture of roots as in *Listera*.

Filament—the stalk of an anther.

Filiform—thread-like; long and very slender.

Fimbriate—fringed.

Foliaceous—leaf-like in texture or appearance.

Fusiform—spindle-shaped; swollen in the middle and narrowing toward each end.

Genus—the smallest natural group containing distinct species.

Gibbous—enlarged or swollen on one side.

Glabrous—devoid of hairs; smooth.

Glandular—with glands.

Glaucous—covered with a bloom, as a plum or cabbage-leaf.

Globose—spherical or nearly so.

Habit—general appearance of a plant.

Habitat—the type of locality in which a plant grows, as woods, field, etc.

Herb—a plant with no persistent woody stem above ground.

Humus—decomposing organic matter in the soil.

Hybrid—a cross between two species.

Imbricate—overlapping either vertically or spirally.

Indigenous—native to a country or region, not introduced.

Inflorescence—the flowering part of plants; its mode of arrangement.

Labellum (see *lip*).

Lanceolate—considerably longer than broad, tapering upward from the middle or below; lance-shaped.

Lateral—fixed on or near the side of an organ.

Ligulate—tongue-shaped.

Linear—long and narrow, with parallel margins.
Lip—a modified petal in the orchid flower, usually differing markedly in size, colouration, and form from the other two petals.
M. (metre)—a measure of length equal to 39.37 inches.
Maculate—blotched or spotted.
Marginate—furnished with a margin of distinct character.
Membranaceous—thin and semi-transparent.
Mentum—spur-like projection formed by the sepals and extended foot of the column.
Mm. (millimetre)—a measure of length equal to 0.039 inch.
Monotypic—having only one exponent, as a genus with but one species.
Muskeg—a moss bog, common in boreal regions.
Nervose—prominently nerved.
Node—the place upon a stem which normally bears a leaf or whorl of leaves.
Ob—a prefix, meaning inversely or oppositely, as in *obovate*.
Oblanceolate—lanceolate, with the broadest part toward the apex.
Oblique—slanting; unequal-sided.
Oblong—longer than broad, with the sides nearly parallel, or somewhat curving.
Obovate—the reverse of ovate, the terminal half broader than the basal.
Obtuse—blunt, rounded.
Orbicular—circular.
Ovary—the part of the pistil that contains the ovules (young seeds).
Ovate—shaped like the outline of an egg, with the broader end downward.
Panicle—a loosely arranged compound inflorescence with pedicellate flowers.
Paniculate—resembling a panicle.
Pedicel—the stalk of a single flower in a flower-cluster.
Peduncle—the stalk of an inflorescence.
Perennial—lasting from year to year.
Perianth—the floral envelope, consisting of the calyx (sepals) and corolla (petals), whatever their form.
Petal—one of the divisions of the corolla.

Petaloid—petal-like; in colour and shape resembling a petal.

Petiolate—having a petiole.

Petiole—the leaf-stalk.

Photosynthesis—the formation of carbohydrates, in constructive metabolism, from water and the carbon dioxide of the air in the chlorophyll-containing tissues of plants exposed to light.

Phylogeny—the evolutionary development of a population or of parts or organs of members of a given population.

Pilose—hairy, with soft hairs.

Pistil—the central organ of a flower containing the macrosporanges (ovules).

Pollinia—masses of waxy pollen or of coherent pollen grains.

Pollen—spores or grains borne by the anther, containing the male element (gametophyte).

Polymorphic—having more than one form.

Proboscis—a tubular sucking organ of an insect.

Pseudobulb—thickened and swollen stems, usually with only one internode.

Puberulent—finely pubescent.

Pubescent—covered with hairs.

Raceme—an elongated indeterminate flower-cluster with each flower pedicelled.

Racemose—In racemes, or resembling a raceme.

Rachis—the axis of a compound leaf, or of a spike or raceme.

Reflexed—bent backward abruptly.

Remote—scattered; not close together.

Reticulate—netted.

Retuse—with a shallow notch at a rounded apex.

Revolute—rolled backward from the margins or apex.

Rhizome—underground stem; root-stock; distinguished from a root by presence of nodes, buds, or scale-like leaves.

Rostellum—a little beak; a slender extension from the upper edge of the stigma.

Saccate—bag-shaped; pouchy.

Saprophyte—a plant (usually lacking chlorophyll) living on dead organic matter.

Scape—a peduncle rising from the ground, naked or without proper foliage.

Scapose—bearing or resembling a scape.

Scarious—applied to leaf-like parts or bracts that are not green, but thin, dry, and membranaceous, often more or less translucent.

Scrotiform—pouch-shaped.

Segment—a part of the perianth, as the petal, sepal, or lip; any division or part of a cleft or divided organ.

Sepal—one of the modified leaves of a calyx.

Sessile—not stalked; sitting.

Sheath—a tubular envelope, as the lower part of the leaf, which clasps the stem.

Spatulate—shaped like a spatula; spoon-shaped.

Species—the aggregate of all those individuals which have the same constant and distinctive characters.

Spicate—spike-like.

Spike—an elongate flower-cluster, with sessile or nearly sessile flowers.

Spur—a hollow sac-like or tubular extension of the lip, usually bearing nectar.

Stamen—one of the pollen-bearing organs of the flower.

Staminode—a sterile stamen, or any structure (without anther) corresponding to a stamen.

Stigma—the part of the pistil that receives the pollen.

Stolon—a basal branch rooting at the nodes; horizontal stem at or below the surface of the ground that gives rise to a new plant.

Stoloniferous—producing or bearing stolons.

Striate—marked with fine longitudinal lines of colour or ridges.

Style—the narrowed portion of the pistil which connects the ovary and the stigma.

Sub—a prefix, denoting an approach to the condition designated, as "subacute," meaning somewhat acute.

Subulate—awl-shaped, tapering from base to apex.

Succulent—juicy; fleshy; soft and thickened in texture.

Tapering—regularly diminishing in diameter.

Terete—cylindrical.

Terrestrial—growing on the ground and supported by soil.

Tomentose—with tomentum; densely woolly or pubescent; with matted soft wool-like hairiness.

Translucent—transparent to light.

Tri—a prefix, meaning three.

Truncate—ending abruptly, as if cut off transversely.

Tuber—a thickened and short subterranean branch, having numerous buds.

Tuberoid—a fleshy-thickened root, resembling a tuber.

Undulate—with a wavy margin or surface.

Unifoliolate—One-leaved.

Variety—a plant having minor characters or variations which separate it from the type species.

Vein—a thread of fibro-vascular tissue in a leaf or other organ.

Velamen—a parchment-like sheath or layer of spiral-coated air-cells on the roots of epiphytic orchids, capable of rapidly absorbing moisture.

Venose—having veins.

Ventral—front; relating to the inner face or part of an organ; opposite the back or dorsal part.

Viscid—glutinous; sticky.

Zygomorphic—flowers which are divisible in only one plane into similar halves, as irregular flowers of orchids.

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